Fracture, Sacral Stress

Indexing Metadata/Description

› **Title/condition:** Fracture, Sacral Stress
› **Synonyms:** Stress fracture, sacral; sacral stress fracture; spondylolysis of the sacrum; sacral insufficiency fracture; sacral fatigue fracture
› **Anatomical location/body part affected:** Any aspect of the sacrum, sacral body, sacral crests, sacral hiatus, superior articular process, transverse processes, or promontory of the sacrum
› **Area(s) of specialty:** Aquatic therapy, orthopedic rehabilitation, sports rehabilitation, women’s health
› **ICD-9 codes**
  • 805.6 closed fracture of sacrum and coccyx without mention of spinal cord injury
› **ICD-10 codes**
  • S32.1 fracture of sacrum

(IDC codes are provided for the reader’s reference not for billing purposes)
› **G-Codes**
  • **Mobility G-code set**
    – G8978, Mobility: walking & moving around functional limitation, current status, at therapy episode outset and at reporting intervals
    – G8979, Mobility: walking & moving around functional limitation; projected goal status, at therapy episode outset, at reporting intervals, and at discharge or to end reporting
    – G8980, Mobility: walking & moving around functional limitation, discharge status, at discharge from therapy or to end reporting
  • **Changing & Maintaining Body Position G-code set**
    – G8981, Changing & maintaining body position functional limitation, current status, at therapy episode outset and at reporting intervals
    – G8982, Changing & maintaining body position functional limitation, projected goal status, at therapy episode outset at reporting intervals, and at discharge or to end reporting
    – G8983, Changing & maintaining body position functional limitation, discharge status, at discharge from therapy or to end reporting
  • **Carrying, Moving & Handling Objects G-code set**
    – G8984, Carrying, moving & handling objects functional limitation, current status, at therapy episode outset and at reporting intervals
    – G8985, Carrying, moving & handling objects functional limitation, projected goal status, at therapy episode outset, at reporting intervals, and at discharge or to end reporting
    – G8986, Carrying, moving & handling objects functional limitation, discharge status, at discharge from therapy or to end reporting
  • **Self Care G-code set**
    – G8987, Self care functional limitation, current status, at therapy episode outset and at reporting intervals
    – G8988, Self care functional limitation, projected goal status, at therapy episode outset, at reporting intervals, and at discharge or to end reporting
- G8989, Self care functional limitation, discharge status, at discharge from therapy or to end reporting

**Other PT/OT Primary G-code set**
- G8990, Other physical or occupational primary functional limitation, current status, at therapy episode outset and at reporting intervals
- G8991, Other physical or occupational primary functional limitation, projected goal status, at therapy episode outset, at reporting intervals, and at discharge or to end reporting
- G8992, Other physical or occupational primary functional limitation, discharge status, at discharge from therapy or to end reporting

**Other PT/OT Subsequent G-code set**
- G8993, Other physical or occupational subsequent functional limitation, current status, at therapy episode outset and at reporting intervals
- G8994, Other physical or occupational subsequent functional limitation, projected goal status, at therapy episode outset, at reporting intervals, and at discharge or to end reporting
- G8995, Other physical or occupational subsequent functional limitation, discharge status, at discharge from therapy or to end reporting

<table>
<thead>
<tr>
<th>G-code Modifier</th>
<th>Impairment Limitation Restriction</th>
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<tr>
<td>CH</td>
<td>0 percent impaired, limited or restricted</td>
</tr>
<tr>
<td>CI</td>
<td>At least 1 percent but less than 20 percent impaired, limited or restricted</td>
</tr>
<tr>
<td>CJ</td>
<td>At least 20 percent but less than 40 percent impaired, limited or restricted</td>
</tr>
<tr>
<td>CK</td>
<td>At least 40 percent but less than 60 percent impaired, limited or restricted</td>
</tr>
<tr>
<td>CL</td>
<td>At least 60 percent but less than 80 percent impaired, limited or restricted</td>
</tr>
<tr>
<td>CM</td>
<td>At least 80 percent but less than 100 percent impaired, limited or restricted</td>
</tr>
<tr>
<td>CN</td>
<td>100 percent impaired, limited or restricted</td>
</tr>
</tbody>
</table>

Source: http://www.cms.gov

**Reimbursement**: No specific issues or information regarding reimbursement have been identified

**Presentation/signs and symptoms**
- Sacral stress fracture (SSF) may manifest suddenly or insidiously. Symptoms include intractable pain in the lower back and/or pelvis.\(^1\) The pain may extend into the buttocks and groin.\(^2,3\)
- There is tenderness to palpation over the sacrum, with the pain in the lateral aspect being greater than that in the medial aspect.\(^4\)
- The patient may complain of increased pain with weight-bearing activities and present with an antalgic gait.\(^5\) Pain generally eases with rest.\(^5\) However, as the condition progresses, pain will be experienced during normal daily activities and even at rest.\(^17\)

**Causes, Pathogenesis, & Risk Factors**

**Causes**
- SSF occurs mainly in two different patient populations
  - Women with a history of osteoporosis (insidious onset or mild trauma)\(^6\)
  - Young female athletes
    - SSF in young athletes may be related to the female athlete triad\(^5\)
SSF may also occur as a result of participation in repetitive sport activities such as long-distance running\(^\text{7,8}\) or excessive physical training\(^5\).

- Stress fractures are said to be caused by insufficiency or fatigue\(^9\)

**Pathogenesis**

- Bones can develop microfractures when bone resorption exceeds bone formation. With prolonged imbalance, microfractures can progress to stress fractures\(^17\).

**Types of stress fractures**\(^9\)

- **Insufficiency fractures**
  - A deteriorating skeletal system (due to osteoporosis) is placed under forces it cannot sustain and a stress fracture results

- **Fatigue fractures**
  - A healthy skeletal system is placed under atypical forces it cannot sustain and a stress fracture results

**Risk factors**

- Females more frequently than males\(^1,7\)
- Osteoporosis\(^6\)
- Osteopenia from prolonged corticosteroid use\(^1\)
- Female athlete triad (disordered eating,amenorrhea, and osteoporosis)\(^5\)
- Long-distance running\(^7,8\)
- Leg length discrepancy\(^9\)
- Existing pelvic fractures\(^1\)
- Radiation therapy\(^10\)
- Post-lumbosacral arthrodesis\(^11,12\)
- Pregnancy\(^13\)
- Footwear\(^9\)

**Overall Contraindications/Precautions**

- If there is a history of osteoporosis, use precautions during the examination and while performing manual therapy to avoid causing additional fractures. Also avoid excessive spinal flexion and extension to minimize risk of additional fractures
- Athletes will often be ordered to avoid bearing weight on the pelvis until they can walk pain free, usually 1-2 weeks.\(^14\) The clinician must confirm weight-bearing status with the treating physician
- See specific Contraindications/precautions to examination and Contraindications/precautions under Assessment/Plan of Care

**Examination**

- **History**
  - **History of present illness/injury**
    - **Mechanism of injury or etiology of illness:** What are the present symptoms? When did the symptoms begin? Any recent trauma? Inquire about typical footwear
    - **Course of treatment**
      - **Medical management:** Treatment is typically conservative. The physician may restrict the patient’s weight-bearing
        - Sacroplasty for treatment of painful sacral insufficiency stress fractures is a treatment option that involves percutaneous injection of polymethylmethacrylate\(^18\)
        - Researchers in the United States found sacroplasty to be a safe and effective treatment for patients not responding to conservative treatment in a retrospective review involving 57 patients between 2004 and 2011\(^18\)
      - **Medications for current illness/injury:** Determine what medications clinician has prescribed; are they being taken? Commonly, nonsteroidal anti-inflammatory drugs (NSAIDs) and vitamin D and calcium supplements will be recommended.\(^2\) Opioids may be prescribed for painful sacral insufficiency fractures
- **Diagnostic tests completed**
  - X-rays of sacrum are misleading and reportedly inadequate for this diagnosis; however, they may be used to rule out other pathology\(^{(5)}\)
  - The following tests may be used to assist in making the diagnosis\(^{(5,15)}\)
    - Magnetic resonance imaging (MRI)
    - Bone scan
    - Computed tomography (CT) scan
- **Home remedies/alternative therapies**: Document any use of home remedies (e.g., ice or heating pack) or alternative therapies (e.g., acupuncture) and whether or not they help
- **Previous therapy**: Document whether patient has had occupational or physical therapy for this or other conditions and what specific treatments were helpful or not helpful
  - **Aggravating/easing factors** (and length of time each item is performed before the symptoms come on or are eased): Weight-bearing activities typically aggravate symptoms. Pain generally eases with rest\(^{(5)}\)
  - **Body chart**: Use body chart to document location and nature of symptoms. Symptoms include intractable pain in the lower back and/or pelvis.\(^{(1)}\) The pain may extend into the buttocks and groin.\(^{(2,3)}\) There is tenderness to palpation over the sacrum, with the pain in the lateral aspect being greater than that in the medial aspect\(^{(4)}\)
  - **Nature of symptoms**: Document nature of symptoms (e.g., constant vs. intermittent, sharp, dull, aching, burning, numbness, tingling). SSF may be the cause of low back pain in older adult females with osteoporosis. Patient may have intractable pain and tenderness to palpation
  - **Rating of symptoms**: Use a visual analog scale (VAS) or 0-10 scale to assess symptoms at their best, at their worst, and at the moment (specifically address if pain is present now and how much)
  - **Pattern of symptoms**: Document changes in symptoms throughout the day and night, if any (A.M., mid-day, P.M., night); also document changes in symptoms due to weather or other external variables
  - **Sleep disturbance**: Document number of wakings/night, if any
  - **Other symptoms**: Document other symptoms patient may be experiencing which could indicate an exacerbation of the condition and/or symptoms that could be indicative of a need to refer to physician (e.g., dizziness, bowel/bladder/sexual dysfunction, saddle anesthesia)
  - **Respiratory status**: In the elderly patients, the clinician should note any supplemental oxygen, etc.
- **Barriers to learning**
  - Are there any barriers to learning? Yes___ No___
  - If Yes, describe _______________________
- **Medical history**
  - **Past medical history**
    - **Previous history of same/similar diagnosis**: Existing pelvic fractures increase the risk of SSF\(^{(1)}\)
    - **Comorbid diagnoses**: Ask patient about other problems, including diabetes, cancer, heart disease, complications of pregnancy, psychiatric disorders, orthopedic disorders, osteoporosis, osteopenia, osteoporosis-related fractures, Paget’s disease, liver transplantation, female athlete triad\(^{(9)}\) and/or prolonged corticosteroid use
    - **Medications previously prescribed**: Obtain a comprehensive list of medications prescribed and/or being taken (including over-the-counterdrugs). Radiation therapy increases the risk of SSF\(^{(10)}\)
    - **Other symptoms**: Ask patient about other symptoms he/she may be experiencing. In the young athlete, is there an eating disorder or amenorrhea present?
- **Social/occupational history**
  - **Patient’s goals**: Document what the patient hopes to accomplish with therapy and in general
  - **Vocation/avocation and associated repetitive behaviors, if any**: Does the patient participate in sports? If so, what is the patient’s training schedule and level of competition? SSF may occur as a result of participation in repetitive sport activities such as long-distance running\(^{(2,8)}\) or excessive physical training
  - **Functional limitations/assistance with ADLs/adaptive equipment**: Document prior functional limitations, required assistance with ADLs and any adaptive equipment the patient has at home
  - **Living environment**: Number of stairs, number of floors in home, with whom patient lives, caregivers, etc. Identify if there are barriers to independence in the home; any modifications necessary?
Relevant tests and measures: (While tests and measures are listed in alphabetical order, sequencing should be appropriate to patient medical condition, functional status, and setting)

- **Anthropometric characteristics:** Assess for leg length discrepancy
- **Arousal, attention, cognition (including memory, problem solving):** Assess as indicated in the elderly population
- **Assistive and adaptive devices**
  - Evaluate for assistive gait devices
  - What is the weight-bearing status and can the patient comply with it?
  - Evaluate for the use of pelvic corsets and sacroiliac joint belts for support
- **Balance:** Evaluate balance reactions in stance as weight-bearing status permits
- **Cardiorespiratory function and endurance:** Document vital signs during activity, particularly in elderly patients
- **Circulation:** Assess pulse bilaterally and compare
- **Cranial/peripheral nerve integrity**
  - ~2% of stress fractures caused by insufficiency will disrupt lumbosacral nerve roots
- **Functional mobility** (including transfers, etc.): Assess mobility level
- **Gait/locomotion:** Frequently the patient presents with a decreased cadence and noticeably painful gait
  - Biomechanical evaluation of gait
    - Heel strike
    - Toe off
    - Hip hiking or circumduction
    - Trendelenburg gait pattern
- **Muscle strength:** Manual muscle testing of lower extremity musculature as pain allows
- **Palpation:** Palpation typically will reveal marked tenderness over sacrum
- **Posture**
  - Assess for lumbosacral lordosis
  - Assess foot alignment
  - Assess anatomical landmarks for symmetry
    - Posterior superior iliac spine (PSIS)
    - Anterior superior iliac spine (ASIS)
    - Iliac crest
- **Range of motion**
  - Often limited low thoracic/lumbar ROM will be observed
  - Goniometric measurements of hip motions should be noted
- **Reflex testing**
  - Assess quadriceps reflex
  - Assess Achilles reflex
- **Self-care/activities of daily living** (objective testing)
  - Patient self-assessment questionnaires
    - Lower Extremity Functional Scale (LEFS)
    - Back Index
  - Sensory testing
    - Complete a lower extremity dermatome scan
- **Special tests specific to diagnosis**
  - Hop test: to aid in the diagnosis, having a patient perform single leg hopping may elicit symptoms at the stress fracture site

**Assessment/Plan of Care**

- **Contraindications/precautions**
  - Only those contraindications/precautions applicable to this diagnosis are mentioned below, including with regard to modalities. Rehabilitation professionals should always use their professional judgment in their assessment and treatment decisions
Clinicians should follow the guidelines of their clinic/hospital and what is ordered by the patient’s physician. The summary presented below is meant to serve as a guide, not to replace orders from a physician or a clinic’s specific protocols.

**Patients with this diagnosis are at risk for falls; follow facility protocols for fall prevention and post fall prevention instructions at bedside, if inpatient. Ensure that patient and family/caregivers are aware of the potential for falls and educated about fall prevention strategies. Discharge criteria should include independence with fall prevention strategies.**

**Contraindications/precautions to use of modalities**

- **Cryotherapy** contraindications
  - Raynaud’s syndrome
  - Cryoglobulinemia
  - Cold urticaria
  - Paroxysmal cold hemoglobinuria
  - Impaired circulation
  - Over area of nerve regrowth

- **Cryotherapy** precautions
  - Hypertension
  - Hypersensitivity to cold
  - Over an acute wound
  - Over superficial nerves

- **Aquatic therapy** contraindications/precautions
  - Fear of water
  - Avoid warm/hot water if patient is pregnant or has multiple sclerosis, increased risk of hemorrhage (e.g., on anticoagulant medications), impaired thermal regulation, acute inflammation, fever, edema, thrombophlebitis, or acute rheumatoid arthritis
  - Epilepsy
  - Cardiovascular or pulmonary disease
  - Open wounds, catheters, colostomies, IVs, G-tubes
  - Urinary or fecal incontinence
  - Certain dermatologic conditions (e.g., ichthyosis, infection)
  - Venous ulcers
  - Tissues damaged by radiation therapy
  - Peripheral vascular disease
  - Respiratory impairment
  - More than half-body immersion during pregnancy

- **Thermotherapy** contraindications
  - Decreased circulation
  - Decreased sensation
  - Acute/subacute traumatic and inflammatory conditions
  - Skin infections
  - Impaired cognition or language barrier
  - Malignancy
  - Liniments
  - Presence of or tendency for hemorrhage or edema
  - Heat rubs

- **Electrotherapy** contraindications/precautions
  - Do not place electrodes near:
    - Carotid bodies, cardiac pacemakers or implantable cardioverter defibrillators, phrenic nerve or urinary bladder stimulators, phrenic nerve, eyes, gonads
    - Osteomyelitis
    - Hemorrhage
    - Impaired sensation, mental status, communication
    - Cardiovascular disease
- Malignancy
- Dermatological conditions
- Proximity of electromagnetic radiation
- In pregnant women, near the pelvis, lumbar spine, hips, abdomen
- In patients with stroke or seizures, near the neck
- History of spontaneous abortion in pregnant women

› **Diagnosis/need for treatment:** Pain (limiting strength and ROM) and impaired function

› **Rule out**
  - Malignancy \(^{(1)}\)
  - Osteomyelitis \(^{(1)}\)
  - Lumbar radiculitis
  - Sacroiliac joint dysfunction \(^{(4)}\)
  - Spinal stenosis \(^{(1)}\)
  - Vertebral fracture
  - Trochanteric bursitis \(^{(1)}\)
  - Benign tumor \(^{(5)}\)

› **Prognosis**
  - The prognosis is excellent with conservative treatment; improvement is noted 1-2 weeks after fracture, and symptoms typically resolve completely after 6-12 months \(^{(9)}\)

› **Referral to other disciplines**
  - Orthopedic surgeon for possible sacroplasty to inject surgical cement into the sacrum and treat the stress fracture \(^{(3)}\)
  - Medical, nutritional, and psychological intervention for female athlete triad
  - Orthotist for the fabrication of custom orthotics

› **Treatment summary:** Conservative treatment is the mainstay of SSF management. Treatment path varies depending on cause of fracture. Official weight-bearing status should be confirmed though treating physician
  - Insufficiency fractures \(^{(9)}\)
    – The patient may participate in judicious weight-bearing exercise; pain is to be used as a guide to tolerance of the activity
    – Immediate mobilization is recommended in most patients
    – Assistive devices should be implemented as indicated
  - Fatigue fractures \(^{(9)}\)
    – Activity modification – decrease forceful physical training
    – An initial stage of relative rest

<table>
<thead>
<tr>
<th>Problem</th>
<th>Goal</th>
<th>Intervention</th>
<th>Expected Progression</th>
<th>Home Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased pain with transfers and functional mobility</td>
<td>Pain-free transfers and functional mobility</td>
<td><strong>Physical agents and mechanical modalities</strong>&lt;br&gt;Heat pack or cold pack may be used for pain relief&lt;br&gt;&lt;br&gt;<strong>Electrotherapeutic modalities</strong>&lt;br&gt;TENS may be used for pain control (^{(2)})</td>
<td>N/A</td>
<td>Implement a home program to address pain as indicated and appropriate for each unique patient</td>
</tr>
</tbody>
</table>
| Decreased weight-bearing ability in acute phase\(^{(14)}\) | Ambulation with the least restrictive assistive device permitting compliance with any weight-bearing restrictions | **Patient education**  
Joint protection and joint integrity activities for the sacrum when appropriate | Progress patient to least restrictive device as indicated for his or her weight-bearing status | Educate on use of assistive devices in the home |
|---|---|---|---|---|
| **Prescription, application of devices and equipment** | Gait training with assistive devices as indicated by pain and weight bearing status | **Therapeutic exercises**  
Strengthening activities (without excessive pelvic loading)\(^{(2)}\) | Progression to strength training for hip musculature once pain free during gait\(^{(14)}\) | Implement a home program as indicated to address limited strength and ROM |
| Pelvic corsets for support\(^{(2)}\) | Stationary bike\(^{(5)}\) | Pool running/walking\(^{(5)}\) |  |  |
| Decreased ability to ambulate | Gait training without assistive device once the patient is able to ambulate without pain and physician orders permit | **Gait training**  
Gait training with appropriate assistive device as able and indicated by physician |  |  |
Decreased functional and sports ability

<table>
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<tr>
<th>Decreased functional and sports ability</th>
<th>Restore functional ability and return to sports training</th>
<th>Functional training</th>
<th>Progress as indicated and cleared by treating physician</th>
<th>Implement a home program as indicated to address limited sports participation and return to previous level</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Address faulty biomechanics</td>
<td>Manual therapy</td>
<td>Manual stretching for tight muscles (4)</td>
<td>Orthotic consult as indicated</td>
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**Desired Outcomes/Outcome Measures**

› Pain-free transfers and functional mobility
  • Patient self-assessment questionnaires
    – LEFS
    – Back Index
  › Ambulation with the least restrictive assistive device in acute phase, permitting compliance with any weight-bearing restrictions
  › Gait without assistive device once the patient is able to ambulate without pain and physician orders permit
    • Gait assessment
    • Return to pain-free gait without assistive device
  › Restore functional ability and return to sports training
    • Ability to return to sport and sport training
    • Patient self-assessment questionnaires
      – LEFS
      – Back Index

**Maintenance or Prevention**

› Minimize risk factors
  (17)
› Cross-training for participation in sports
› Vitamin D and calcium supplementation for osteoporosis as directed by physician
› Screen for female athlete triad

**Patient Education**


**Coding Matrix**

References are rated using the following codes, listed in order of strength:

- **M** Published meta-analysis
- **SR** Published systematic or integrative literature review
- **RCT** Published research (randomized controlled trial)
- **R** Published research (not randomized controlled trial)
- **G** Case histories, case studies
- **C** Published guidelines
- **RV** Published review of the literature
- **RU** Published research utilization report
- **QI** Published quality improvement report
- **L** Legislation
- **PGR** Published government report
- **PFR** Published funded report
- **PP** Policies, procedures, protocols
- **X** Practice exemplars, stories, opinions
- **GI** General or background information/texts/reports
- **U** Unpublished research, reviews, poster presentations or other such materials
- **CP** Conference proceedings, abstracts, presentation
References