

## Surgical Management of Slipping Rib Syndrome

► Surgeons with the Penn Center for Chest Trauma are performing targeted surgeries to eliminate slipping rib syndrome in affected individuals. A diagnostic conundrum, slipping rib syndrome can be a source of longstanding, intractable upper abdominal or lower thoracic pain and debility.

Slipping rib syndrome is a mechanical defect caused by the breakdown of fibrocartilage at the costal margins of the floating (8th-10th) ribs.<sup>1</sup> With the failure of this cartilage bond, the affected cartilage tip can become independent and impinge one or more of the intercostal nerves serving the thoracic cage. Typically, the first manifestation of slipping rib occurs in the lower chest or flank as acute, stabbing, pain caused by contact between mobile cartilage and the muscle or bone surrounding it. For some individuals, deep respiration is sufficient to bring on slipping rib pain.

**Diagnosis** ~ Delayed diagnosis of slipping rib is more often the rule than the exception. Because cartilage is virtually invisible radiologically, imaging alone is rarely diagnostic, though imaging can rule out muscle tears and other potential causes of pain. Given the variety of differential diagnoses, in addition it is not unusual for patients to present to a series of specialists over years before arriving at a diagnosis.

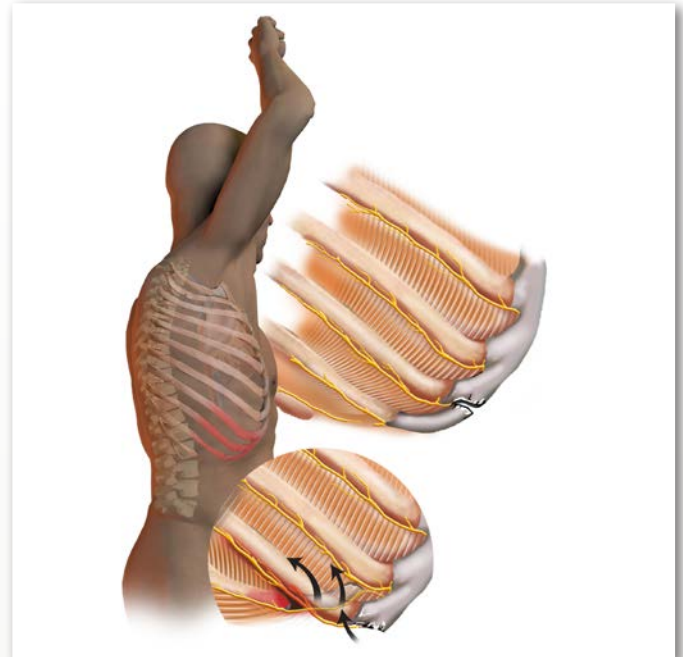
Clinical suspicion can lead to the identification of slipping rib on the basis of symptoms and history and by means of palpation, or the hooking maneuver, which involves placing the fingers beneath the ribcage on the affected side and pulling gently upward or to the side. Pain, clicking or palpable movement of the cartilage fragment is diagnostic.

**Treatment** ~ Because conservative therapy generally has little efficacy once slipping rib has advanced to separation or mobility of the rib segment, surgery is often the best option for care. At the Penn Center for Chest Trauma, this generally involves resection of the hypermobile segment with cartilage resection and, if appropriate, rib plating, while preserving the intercostal neurovascular bundle.

### CASE STUDY

Ms. B, a 32-year-old physician assistant, was referred to the Penn Center for Chest Trauma for evaluation after more than two years of lower right-sided pain radiating from her lower flank. Ms. B's medical history was otherwise unremarkable.

At Penn Medicine, she described her pain as grinding, sharp and excruciating to the point of debility. Her medical regimen included 600 mg naproxen daily and nightly gabapentin 300 mg. Previous therapies, including osteopathic manipulation and nerve blocks brought transient relief, but no cure.



► **Figure 1:** Slipping rib syndrome is a mechanical defect caused by the breakdown of fibrocartilage at the costal margins of the floating (8th-10th) ribs

On physical examination, [Adam Shiroff, MD, FACS](#), director of the Penn Center for Chest Trauma, identified a palpable, mobile, right-sided fragment at the margin of the 10th rib. Following a consultation with Ms. B, at which the range of therapeutic possibilities available were discussed—including anesthetic and steroid nerve blocks—she chose to have the rib fragment surgically removed.

At surgery, a small incision was made in Ms. B's lower right chest wall at the site of the palpable cartilage segment. At this point, the right 10th costal cartilage was found to be completely detached and curled inside the superior rib. A 7 cm segment of the cartilage was then removed with the perichondrium, taking care to avoid the native neurovascular bundle.

Ms. B recovered well, and was released to home the day after her surgery with a prescription for a non-opioid analgesic. At her first follow-up visit, she reported that her pain had largely resolved within two days as her irritated nerves healed, and that she had ceased all medications.

At her three-month visit, Ms. B reported complete resolution of pain and the restoration of normal daily activities, including exercise.

### Reference

1. van Delft EA, van Pul KM, Bloemers FW. The slipping rib syndrome: A case report. *Int J Surg Case Rep* 2016;23:23-4.

## ABOUT THE PENN CENTER FOR CHEST TRAUMA

The Penn Center for Chest Trauma (PCCT) brings together experts from Trauma, Orthopaedic Trauma, Thoracic Surgery, Cardiovascular Surgery, Vascular Surgery, Neurosurgery, and Pain Medicine to treat complex injuries and conditions 24 hours a day, every day.

### Performing Chest Wall Surgery After Injury at Penn Medicine

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For questions about evaluation for slipping rib syndrome, or to schedule a time to connect with Dr. Shiroff, please contact Lauren Plunkett at [215.662.9207](tel:215.662.9207).

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