

Chest Wall Pain Clinical Management Pathway

Chest wall pain in rowing continues to be a significant problem in elite rowing. Its occurrence is frequent and can generate a significant loss of on water training time. Over the 2009, 2010 & 2011 International seasons, chest wall pain constituted 14% of the injury and illness episodes, but generated 24% of the lost training time.

During the 2009 & 2010 domestic and international seasons, amongst elite rowers across Australia, there were 28 cases of chest wall pain that caused a loss of rowing training. 13 of these were confirmed to be bone stress by positive bone scan, while 15 were diagnosed as non bony chest wall pain, with many, but not all confirmed with a negative bone scan. Amongst the 13 cases of bone stress, 3 were further clarified with the use of CT and these were confirmed as stress fractures. Non bony causes of chest wall pain include the costo-chondral joints, intercostals, fascia and thoracic referral.

The median days affected for each category and the causes are listed in Table 1.

Table 1: Episodes of chest wall pain 2009-2010

| | No | Gender | Median | | | Cause | | | | |
|-----------------------|----|-----------|------------------|------------------------|---------------------|-------------------|--------|-----------|---------|-------|
| | | | No Training Days | Modified Training Days | Total Days Affected | On Water Training | Racing | Ergometer | Weights | Other |
| Rib Stress Fractures | 3 | M=1, F=2 | 39.0 | 24.0 | 61.0 | 3 | 0 | 1 | 1 | 0 |
| Rib Stress Reaction | 10 | M=3, F=7 | 23.5 | 20.5 | 48.0 | 8 | 2 | 3 | 0 | 1 |
| Other Chest Wall Pain | 16 | M=10, F=6 | 3.0 | 4.5 | 5.5 | 12 | 1 | 2 | 2 | 0 |

The number of bony and non bony causes of chest wall pain are almost equal (13 vs. 16) over the two year period. However, the time cost of a bony injury is substantially times greater than non bony. Rib stress reactions generate a median of 48 days time affected and rib stress fractures 61 days time affected. In comparison with a median of 5.5 days time affected with other chest wall pain.

The incidence of bony injury in this sample is much higher amongst women. Diagnosis of a bony stress injury in a female rower should prompt consideration of bone health contributors, including energy availability, menstrual cycle irregularities and nutrient intake (calcium, vitamin D & iron).

One of the risks of failing to diagnose a bony cause of rib pain early is that the athlete may not be removed from training, thus potentially making the stress reaction or fracture worse. The statistics outlined in Table 1 highlight that if a stress reaction progresses to a stress fracture, an extra 13 days will be lost.

Over the last three years physiotherapists working with elite rowers suffering chest wall pain have collected data on seven diagnostic tests. The diagnostic tests that were recorded are shown in Table 2.

Table 2: Diagnostic Tests

| Subjective Measures | Objective Measures |
|---------------------|--------------------|
| Night pain | Deep breath |
| Pain on ADL | Cough |
| | Sit up |
| | Push up |
| | Rib spring |

These tests are giving us a very good indication of when the chest wall pain is likely to be bony in nature. The predictive nature of these tests is outlined in Table 3 below.

Table 3: Likelihood of bone stress

| Session | Sensitivity | Specificity | Positive likelihood ratio |
|---------|-------------|-------------|---------------------------|
| 1 | 0.61 | 0.75 | 2.46 |
| 2 | 0.73 | 0.80 | 3.64 |
| 3 | 0.70 | 0.73 | 2.56 |
| 4 | 0.87 | 0.87 | 3.79 |
| 5 | 0.77 | 0.77 | 3.79 |

Athletes that present with five or more tests positive at first presentation are nearly 2.5 times more likely to have bone stress, whereas four days later if they still have five or more tests positive they are nearly four times more likely to have bone stress.

So when an athlete presents with chest wall pain, we now have a very good idea of the nature of the injury and how much time the athlete is likely to be affected for. This data was collected on pain that existed between the lateral border of the scapula and the anterior chest, so may not be relevant to pain that is more posterior on the chest.

Considering all this information, removing all athletes with chest wall pain from rowing training for a minimum of 4 days is a sensible option. Four days allows a substantial number of athletes with non bony chest wall pain to settle, and then on Day 4 we can make a well educated decision about who is appropriate to return to training, versus those that need to be managed as a likely bone stress injury. Most importantly it is likely to prevent the worsening of the bony cases and the longer lasting cases of non bony chest wall pain. As mentioned above, 4 days early in the management phase may save 13 days later on.

Ideally all rowers with chest wall pain should be assessed by both a doctor and physiotherapist that are members of the NRCE Preferred Providers network. All rowers that present to a physiotherapist for management of chest wall pain that remains for longer than four to five days should be referred to a doctor for further assessment.

The attached flow chart outlines a way of approaching the management of chest wall pain in an elite rower.

Over the last few years, the common advice to athletes diagnosed with a rib stress reaction is that two weeks off rowing training is the likely management. In fact, the quickest any athlete got back to modified rowing training was 16 days and the median was 23.5 days. Based on this, it seems our advice should be more around the 3 to 4 week mark. Those diagnosed as a rib stress fracture were off the water for 39 days before commencing modified training which is closer to the time frames currently advised (4 to 6 weeks).

If guidance with the medical management of a National Rowing Scholarship Tier 1-3 athlete is needed, please contact Dr Carmel Goodman as soon as possible. As the Rowing Australia Principal Medical Officer, she has significant experience dealing with these problems.

If guidance is needed regarding progression back into training of a National Rowing Scholarship Tier 1-3 athlete, please contact Ivan Hooper the Sports Medicine Co-ordinator for the National Rowing Centre of Excellence.