

# Self-treatment of mid-thoracic dysfunction: a key link in the body axis

## Part Three: Clinical issues

### Introduction

Dysfunction involving excessive T4–T8 kyphosis is very common. Symptoms arising from regions at a distance to the mid-thoracic area are often secondary to T4–T8 dysfunction. Parts One and Two of this series have shown how to assess and treat this dysfunction. In this third and final part of the series some basic clinical issues important for successful incorporation of these management strategies into your practice will be discussed.

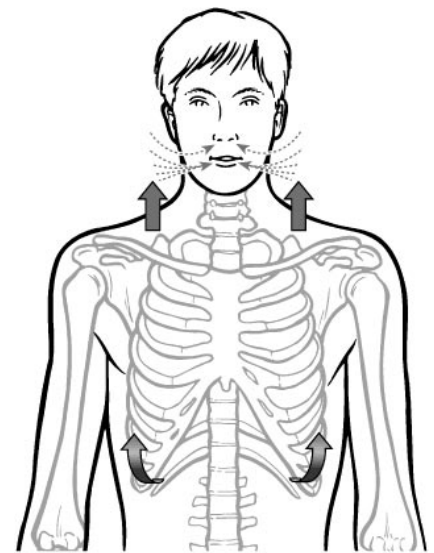
In particular, the why (rationale), when (indications), what (skills), and how (practical integration) of addressing T4–8 dysfunction will be summarized.

### Why

Mid-thoracic dysfunction affects the whole body's center of alignment, and thus posture. Head and neck forces are increased as a result of the head forward posture. Shoulder strain and glenohumeral impingement is more likely due to the forward drawn shoulder. Lumbar disc syndromes and nerve impingement have been shown to

result from repetitive end-range flexion overload (Callaghan & McGill 2001).

Faulty respiration and mid-thoracic dysfunction affect one another. The most common fault with improper respiration is inhalation by means of raising the rib cage vertically (Fig. 1). Vertical chest breathing overactivates the scalenes and shoulder girdle elevators (i.e. upper trapezius, levator scapulae) and results in poor



**Fig. 1** Faulty respiration – upright.

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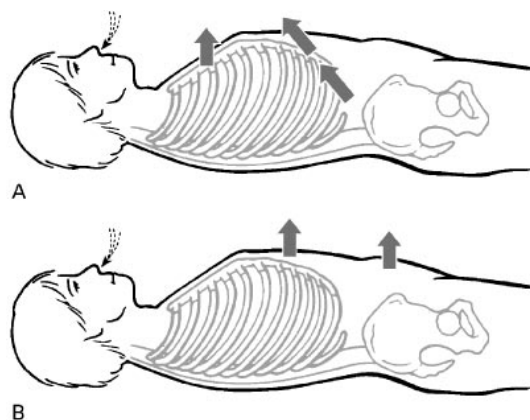
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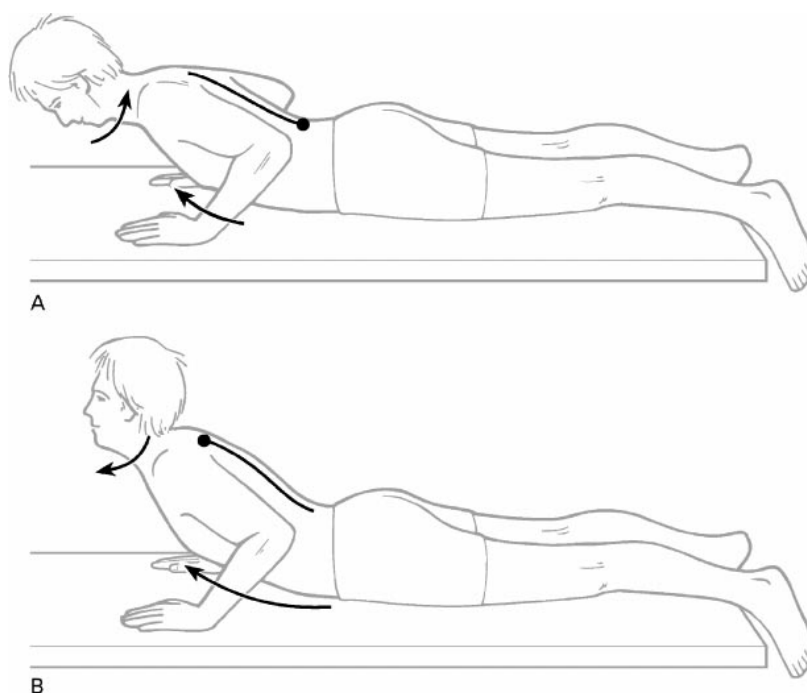
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**Fig. 2** Faulty respiration – supine. (A) Incorrect; (B) correct.



**Fig. 3** Kolár's prone trunk extension test. (A) Correct; (B) incorrect.

fixation of the lower ribs (Lewit 1999). Similarly, in the supine position if the diaphragm is not functioning properly during inhalation, the lower ribs will move cephalad (Fig. 2). Without fixation of the lower ribs during trunk extension tasks the mid-thoracic spine cannot extend properly and compensatory lumbo-sacral or thoraco-lumbar hyperextension typically results (Fig. 3) (Kolár 2002).

### When

T4–T8 dysfunction should be treated whenever head/neck, upper quarter, mid back, or low back problems are seen in a patient with decreased extension mobility of the midthoracic spine. The standing arm elevation test is a basic assessment tool for screening purposes (see JBMT 5(2): 90–98) (Fig. 4). Also, evaluation of static posture both seated and standing is important

(Fig. 5). Increased thoraco-lumbar hypertonus is a classic sign of overactivity of the superficial 'global' muscles and indicates poor 'deep' muscle function (Janda 1996, Richardson 1999, Jull 2000, Hodges 2002) (Fig. 6).

When observation of the patient indicates that T4–8 dysfunction is present, motion palpation of passive joint mobility and quality of end-feel is also indicated. This is best performed in the seated position as shown by Brügger (Fig. 7) (Brügger 2000, Petak 2002).

### What

Managing T4–8 dysfunction requires a broad skill set incorporating postural advice, manual manipulation, and therapeutic exercise. A number of exercises have been recommended in this series (see Table 1).

### How

Knowing why mid-thoracic dysfunction is clinically important, when it should be addressed, and what techniques are therapeutic is only the beginning point for successful management of the patient with a problem in this area. Unless it is understood how to incorporate this knowledge and skill into patient care efficiently results will be unsatisfactory. First, patients should appreciate how important this dysfunction is as a perpetuator of their symptoms. Second, they should appreciate how even when symptoms decrease that prevention of recurrence depends on optimizing functional integrity in this area. Insight by the patient about the importance of economical upright posture arises gradually as a result of a continued dialogue between health care provider and patient. A moment or two per session spent explaining the relationship between function and pain is essential.

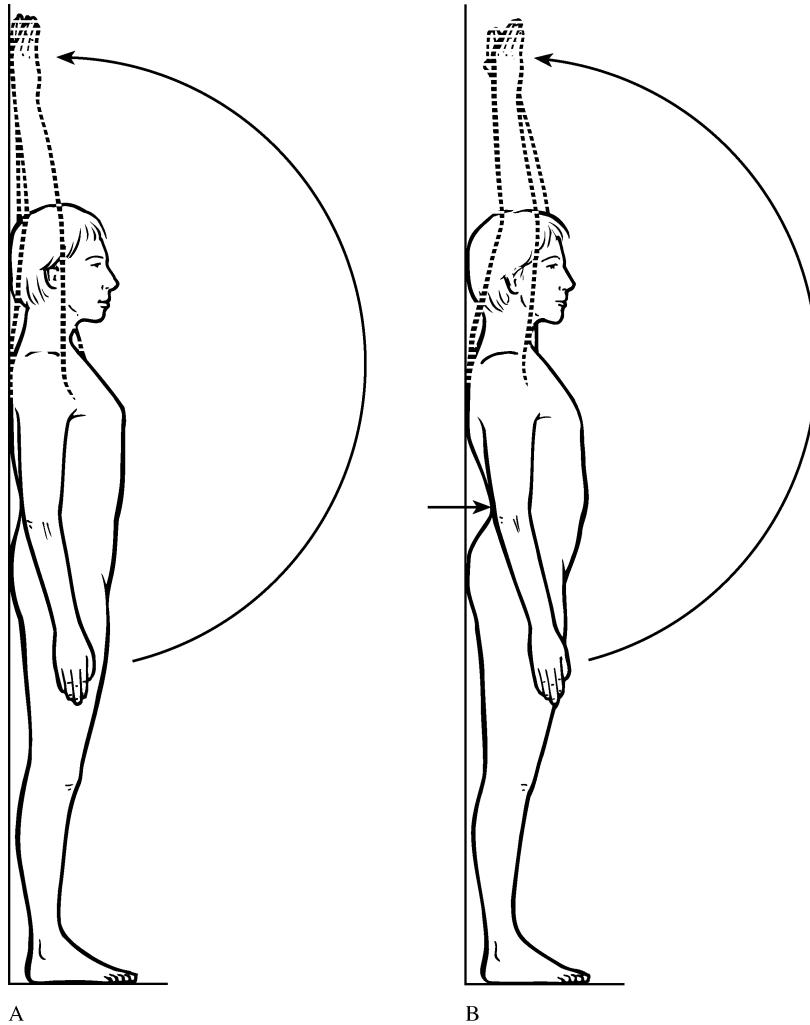


Fig. 4 Standing arm elevation test here. (A) Correct; (B) incorrect.

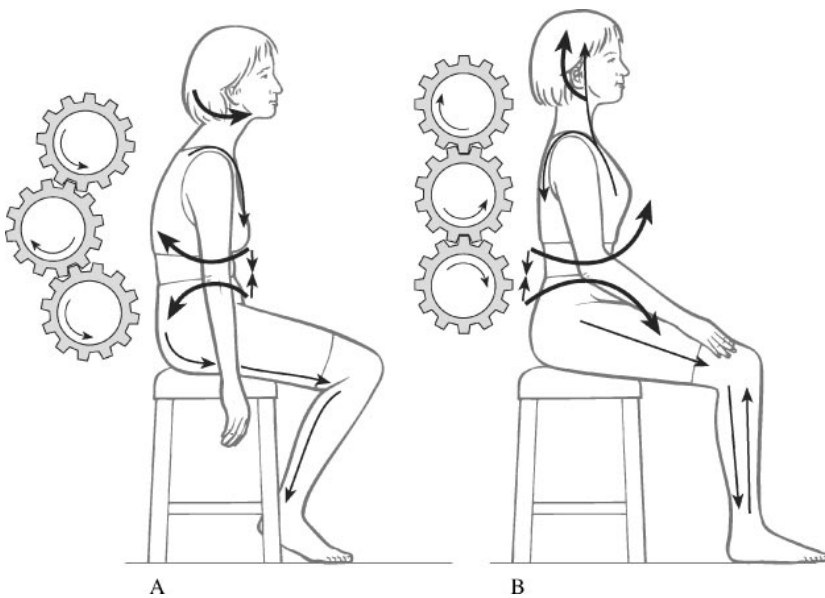


Fig. 5 Postural evaluation.

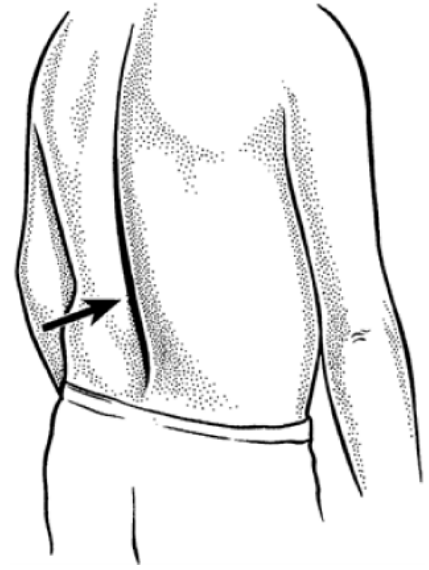


Fig. 6 Thoraco-lumbar hypertonus.



Fig. 7 Brügger's palpation of passive T4-8 extension mobility.

**Table 1** Exercises for improving T4-8 extension mobility

- Brügger relief position
- Wall lean
- Upper back cat
- Back stretch on the ball
- Back stretch with foam rolls
- Active prayer stretch
- Kolár's wall slide with arm elevation
- Lower abdominal breathing
- Kolár's prone trunk extension

Each exercise has its particular advantages and disadvantages. What follows is a brief review of practical issues regarding the exercises presented in this series.

### **Brügger relief position**

Advantages:

- This exercise is ideal for use at the workplace as a 'micro-break'.
- It activates an entire chain of muscles linked to the upright posture and thus works at a neurological level.

Disadvantages:

- There is a tendency to hyperextend the lumbo-sacral and thoraco-lumbar spines with this exercise. Thus, performing it with active exhalation is important.
- Most low back patients benefit more from getting out of the chair completely, so this exercise is more suitable for neck and upper quarter patients or the Brügger exercise can be performed in the standing posture.

### **Wall lean**

Advantages:

- This exercise is effective for individuals with a fixed thoracic kyphosis who have relatively good motor control.

Disadvantages:

- If the patient has difficulty relaxing their upper trapezius.
- If the patient is hyperlordotic.

### **Upper back cat**

Advantages:

- Strongly isolates the mid-thoracic region.

Disadvantages:

- Requires good motor control to perform.

- Is sometimes difficult for the patient to avoid overstretch of the shoulder.

### **Back stretch on the ball**

Advantages:

- Extremely comfortable and relaxing.
- Head can be supported.
- Promotes improved respiration.

Disadvantages:

- Difficult at first if the person has poor balance.
- Requires a very large ball if the patient is barrel chested or has a fixed head forward posture.
- Can cause dizziness at first.

### **Back stretch with foam rolls**

Advantages:

- Excellent segmental isolation of the area of fixed kyphosis.

Disadvantages:

- Can be painful at first.

### **Active prayer stretch**

Advantages:

- Increases strength of the dorsal erector spinae.

Disadvantages:

- Requires a high level of motor control.
- Difficulty to relax upper trapezius.

### **Kolár's wall slide with arm elevation**

Advantages:

- Is highly functional since it incorporates arm elevation, squatting and breathing.

Disadvantages:

- Requires high level of motor control to coordinate.

### **Lower abdominal breathing (Fig. 2)**

Advantages:

- Trains diaphragmatic breathing with proper fixation of the lower ribs.

Disadvantages:

- Advanced exercise.

### **Kolár's prone trunk extension (Fig. 3)**

Advantages:

- Facilitates the dorsal erector spinae.
- Trains co-activation of oblique abdominal muscles with dorsal erector spinae so that lumbar spine hyperextension does not substitute for thoracic extension.

Disadvantages:

- Requires a very high level of motor control.
- Difficult to avoid lumbar hyperlordosis.

### **Summary**

T4-8 dysfunction is a common perpetuating factor of muscle imbalance, trigger points, joint dysfunction, and faulty movement patterns. It is often asymptomatic, but is a key source of biomechanical overload involving the neck, TMJ, shoulder, arm, and even low back regions. Treatments which aim only at the site of symptoms are bound to fail if function is disturbed due to excessive kyphosis in the mid-back.

Rehabilitation of the upright posture is fundamental to optimization of function in the locomotor system. Any source of peripheral nociception that is perpetuated by increased kyphosis is best treated by concurrent treatment of the peripheral pain generator and the biomechanical source of overload in the postural kinetic chain. Neurological programs for maintenance of the upright posture

are 'hard-wired' into the central nervous system making rehabilitation of the mid-thoracic area of central importance both biomechanically and neurophysiologically. A classic example of the importance of this region for function is if one attempts either full inhalation or arm elevation in the slumped posture and then compares it with sitting upright in a Brügger position. As this series and these examples show improving the upright posture immediately improves function. Treatment of pain in the locomotor system should always be accompanied by rehabilitation of function. This series has shown how the mid-thoracic region can be assessed and treated and why this is 'linked' to a multitude of common musculoskeletal pain syndromes.

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