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## Don't let musculo-skeletal pain hold you back: A monumental hurdle, especially in young cardiothoracic and vascular surgeons

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### Abstract

Surgeons, especially the cardio-vascular and thoracic surgery residents have been facing this unaddressed and hazardous working conditions due to ergonomic deficits found throughout their learning and career duration in operating theatres.

As a result of holding awkward or stationary positions throughout protracted surgeries throughout a career, more than 80% of surgeons have passed away from a work-related sickness or accident. While the patient is the procedure's main emphasis, good posture and spinal stability are not given much consideration at the same time. Even when discomfort is there, signs are frequently disregarded. This causes a decline in output and could ultimately jeopardise surgical careers. Often, surgeons are not aware of suggestions or instructions intended to increase their comfort while performing. Additionally, there is a notable dearth of formal ergonomic instruction.

In the operating room, a number of controllable risk factors can be changed to create a safer working environment. In addition, to enhance the surgeon's posture and musculoskeletal health, strengthening, stability, and exercise programmes under the guidance of a qualified therapist may be used.

It is alarming when you learn that a lot of CVTS surgeons struggle with long-term Musculo-skeletal issues because of the strenuous physical demands of our work. Similar to professional athletes, surgeons need to be in shape in order to perform at their finest. To ensure that we can perform at our best and sustain career longevity, we must enhance our working environment and maintain our physical health.

**Keywords:** Cervical spine, ergonomics, occupational injury, surgeon health, musculoskeletal (MSK)

### Introduction

In a fast-paced, productivity-driven atmosphere, where stress and fatigue-related thoughts and concerns are frequently discouraged or disregarded, surgeons are conditioned and receive training. Medical students and residents are expected to be young, and energetic and hence senior surgeons are unwilling to acknowledge or talk to their trainees about any personal flaws or limits. This unsatisfactory connection is a significant obstacle to advancement and free discussion. The negative effects on physical and mental health are profound.

Despite all the advancements in medical technology, operating rooms still do not have ergonomically sound designs or take the health of the surgeon into consideration. The surgeon is put through a lot of strain due to the limited mobility of the operating tables, the hard operating room floors, improper table height, the weight of the surgical loupes (Fig. 1), some head mounts, and the light source during lengthy operations. For several hours, the surgeon stands and performs strenuous and demanding surgeries; as a result, studies have shown that 50 to 85% of practising surgeons worldwide regularly experience musculoskeletal discomfort in the neck, shoulders, and back.

The risk of injury is higher for surgeons who have a history of pre-existing disorders such as cervical spondylosis, arthritis, cervical discogenic pain, myofascial pain, and cervical radiculopathy. Neurapraxia risk is also correlated with case volume, duration, hand size in relation to equipment, and non-compliant devices. When operating in the most extreme thoracic instances for lung diseases or in significant thoracic or abdominal vascular cases separate from the cardiac surgical cases, a prolonged static posture increases the physical strain exerted on the musculoskeletal system.

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Due to their injuries, half of these surgeons have problems performing operations, while 20 to 25 percent skip work or conduct fewer surgeries as a direct result of their injury and declining health. Sadly, only a very small percentage of surgeons really claimed to have been injured. Medical costs for accidents at work now approach hundreds of millions annually, inflicting a significant financial burden on society.

### Proper Posture

For both minimally invasive and open procedures, maintaining a neutral stance depends on the height of the table. The height of the table should be equal to the surgeon's elbow. The forearm should be in a neutral, horizontal position at a point between supination and pronation, and the angle of the arm and elbow should be between 90 and 120 degrees when standing comfortably. (Fig. 2) As the ergonomic safety of all engaged employees is essential to the effectiveness and success of the operation, the surgeon should also be aware of the height of his or her assistant or co-surgeon.

The surgeon must lift his or her arms when the table is too high and adjust the angle of the forearm and wrist to compensate for the need to grip the instruments. Due to the wrist and shoulder joints' extreme extension, this wears them out and hurts them. Suture placement and delicate dissection are made difficult by this discomfort. It is typical to rely on antiquated, motion-limited equipment, especially at table height. It can be required for the hospital to make a capital expenditure to buy modern operating room tables.

In addition, a surgeon frequently needs to stand on a step stool when a table is raised too high. As a result, the surgeon's workspace is reduced. A foot pedal or cables in this area could throw the surgeon's balance off, resulting in an accidental motion that could injure the patient. Furthermore, if someone were to fall off the platform, the surgeon might suffer an injury. If an electrocautery foot pedal is utilised, it should be level with the surgeon's foot and pointed in the direction of the targeted anatomy. As a result, there won't be any unneeded shifting of the legs or feet or awkward positions when cauterising tissue. To provide additional safety, think about always putting two platforms next to each other and two platforms behind to prevent accidentally falling off the rear of the stool.

### Remedies for Musculo-skeletal assault

In order to manage their symptoms, surgeons with MSK injuries have a variety of choices at their disposal, including non-steroid anti-inflammatory drugs, muscle relaxants, and other therapies including massage, acupuncture, and physical therapy. Drug usage and dependence carry risks, which should not be disregarded. An increase in sick leave, changes or restrictions to their practise, temporary reassignment to nonsurgical jobs, or early retirement may all be necessary for surgeons who sustain a work-related accident. Self-medication or the use of analgesics may reduce symptoms, but they do not address the underlying problem. The ultimate objective would be to identify the root causes at an early stage and take corrective action to reduce pain and impairment while enhancing career longevity.

There are various operating room safety precautions a surgeon can take to safeguard his or her MSK health, thus the ergonomics of surgery need not exclusively rely on the tools available. (Fig 3)

Exercise-guided breaks of one to two minutes were used in a multicenter research by Hallbeck et al., spaced every 20 to 40 minutes of operation time or as prescribed by a doctor. During procedures spanning between two and twelve hours, these

activities emphasised rotating motions and the activation of muscle groups in the neck, back, hands, and lower extremities. Results showed that microbreaks did not lengthen operation time, interfere with the procedure's workflow, or create any distractions. Surgeons noted an enhancement in their ability to concentrate and perform physically.

These sterility-preserving exercises included neck flexion, extension, and lateral rotation with chin touches from shoulder to shoulder at a slow, controlled pace; a backward shoulder roll and chest stretch; a stretch of the upper back and hands; flexion and extension of the low back; contraction of the gluteus maximus; and foot and heel lifts for lower extremity and ankle stretches. Positive outcomes were shown, with improvements in both physical and mental performance and no effect on case duration.

Simple postural rests should be used to reposition the body to a neutral stance and release tension in the neck, torso, and extremities, even if they are not official procedure breaks. To reduce stress on the body, additional sterile intraoperative stretches and exercises may be done.

Different from the standard operational manoeuvres, there are a few different approaches to approach these issues, including the following:

### Simple, non-jerky movements

Gentle and slow paced neck movements from side to side touching chin to either shoulders, lateral flexions, neck extensions and flexions can benefit a lot if done in frequent intervals and reduce the strain on the surgeon.

### Ice and Heat Therapy

Applying a cold compress to the affected area of the neck 2-3 times per day for 15 to 30 minutes at a time will help reduce swelling and relieve pain during the first two to three days after an acute MSK discomfort or spasm. The muscles in the neck can then be relaxed by applying moist heat, such as that from a warm bath or shower.

### Medications

For neck discomfort that is musculoskeletal or nerve-related, several medications, such as muscle relaxants, nonsteroidal anti-inflammatories (NSAIDs), and paracetamol, may be recommended.

If your pain is severe, you might need to take opioid prescription pain relievers. Doctors may suggest taking oral steroids (like prednisone) or giving a steroid injection (cortisone) if you have central cord syndrome or cervical radiculopathy. Steroids work well in easing pain in addition to reducing inflammation.

### Physical Therapy

In order to treat neck pain, strengthen your neck muscles (using cervical traction), and improve your neck's range of motion for neck strains and cervical radiculopathy, your physical therapist may recommend specific exercises for you to perform.

In addition to stretching your muscles, cervical spondylosis therapy options may include posture correction and short-term use of a soft cervical collar.

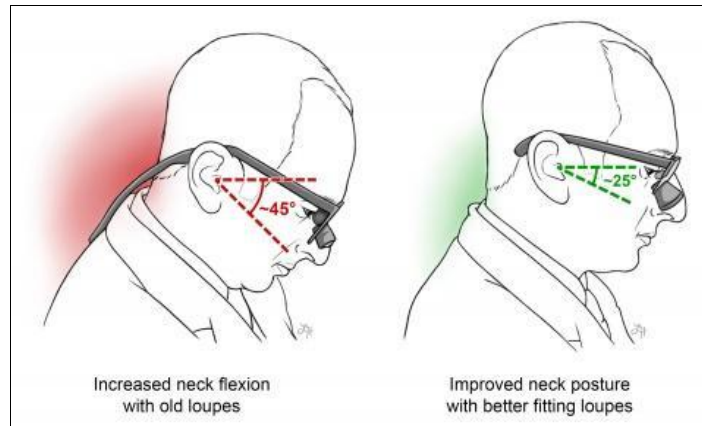
### Complementary Therapies

In order to relieve discomfort, complementary therapies are occasionally combined with conventional drugs or treatments. For neck strains, for instance, massage therapy, acupuncture, or biofeedback may be beneficial. Myofascial discomfort can be managed by trigger point injections.

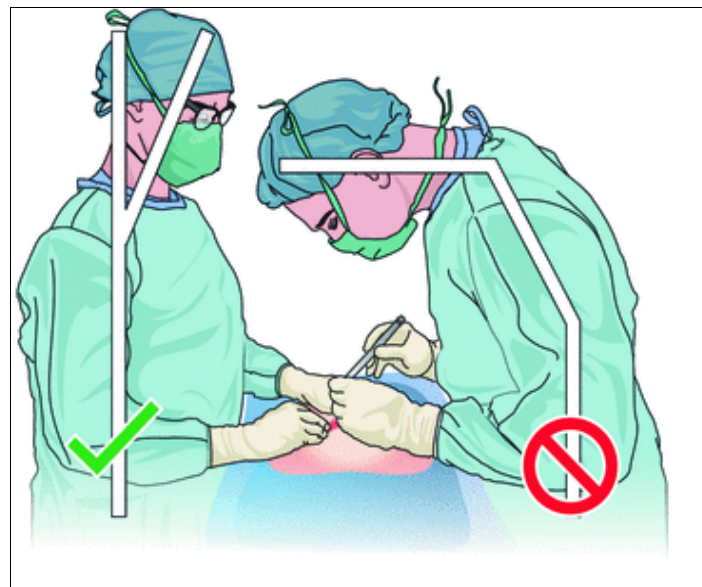
**Prevention better than cure**

Programmes, resources, and practises can all be used to treat and prevent MSK injuries in surgeons who are in good health. As the mechanical aetiology of instability and pain will differ across individuals, they should be tailored. While it is impossible to cover all the methods for preventing and treating MSK diseases in this article, it is crucial to acquire the proper training from a licenced therapist before beginning any functional movement or strengthening regimen. The torso and cervical spine are

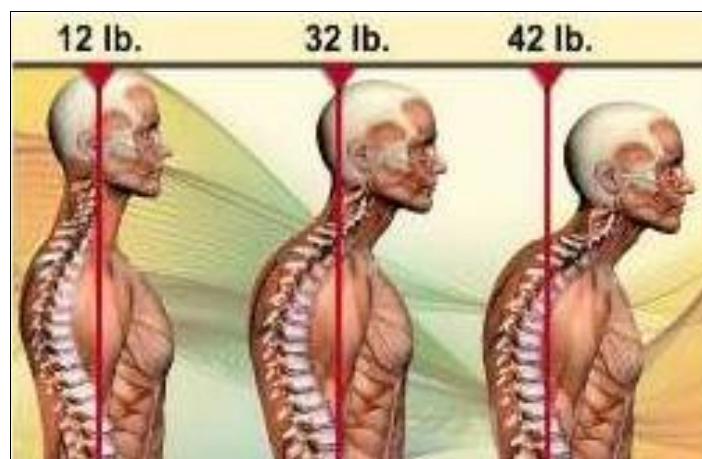
stabilised by increasing the strength and stability of the cervical and lumbopelvic hip complex. In order to transfer weight-bearing loads safely, one needs balancing, plyometric, and strengthening exercises that concentrate on a neutral spine and good trunk alignment. Any programme should be carried out in a step-by-step manner, starting with the recruitment of local muscles, followed by stabilisation postures, and then dynamic body movements.



**Fig 1:** Over flexion of the neck while using a loupe



**Fig 2:** Proper vs Improper Ergonomics



**Fig 3:** Burden of weight increases with angulation

## Conclusion

The performance of an operation may put the surgeon at risk for developing persistent MSK injuries across all CVT surgical techniques. Injury avoidance is essential in a physically demanding work. This can be accomplished by combining the enhancement of operating room ergonomics with the maintenance of health through specialised training programmes. The majority of surgeons are unaware of the importance of operating posture, ergonomics, and risk reduction through practise adjustments, workplace improvements, and prevention efforts. The cumulative risk to MSK health has an effect on output, job satisfaction, and, ultimately, career length. It is rarely recognised until an injury occurs. By raising awareness and advocating for change, we can improve the well-being of surgeons and keep a skilled workforce available to perform surgery on our patients.

## Compliance with ethical standards

**Conflict of Interest:** The author declares that he has no conflict of interest.

**Informed Consent:** Not required.

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