

Sitting and the Effects on the Spine

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Objectives

- Understand the impact of prolonged flexion on the spine.
- Identify three major sitting postural positions – slumped sitting, thoracic upright sitting, and lumbo-pelvic upright sitting.
- Determine the most ideal sitting postural position.
- Recognize interventions that will promote ideal sitting posture.
- Devise strategies that will minimize the negative effects of sitting.

Negative Effects of Prolonged Flexion

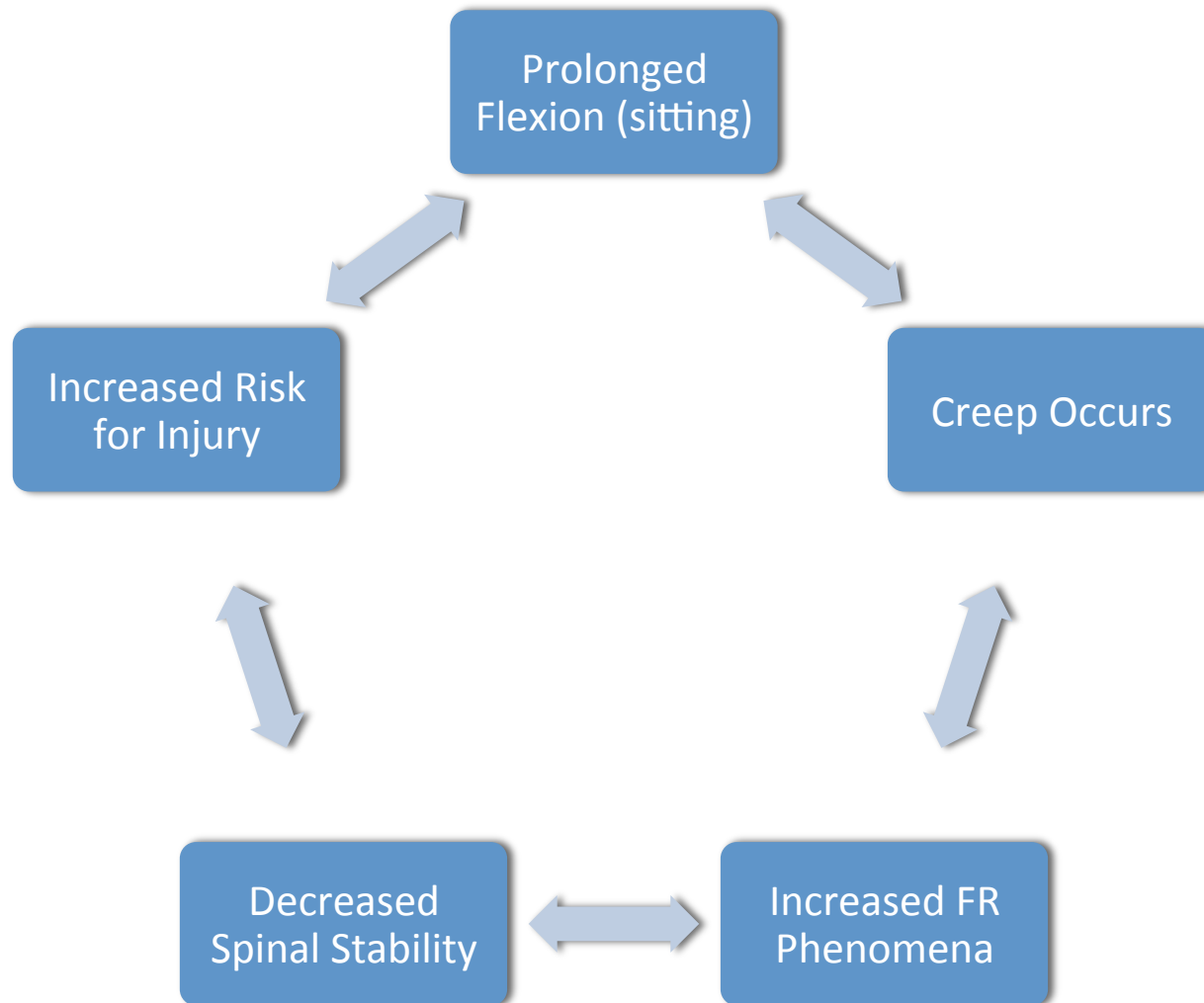
On the Lumbar and Cervical Spine

Definitions¹

Flexion-Relaxation (FR) Phenomena – the transfer of extension moment from active musculature to passive tissues in the course of lumbar flexion

Creep – stress relaxation of the body's tissues

Negative Effects of Sitting



Negative Effects of Prolonged Flexion

↑ Stiffness²

- Force transducer used to measure tension on spinal tissues
- Stiffness increases after one and two hours of sitting

↓ Stability^{1,3-4}

- Prolonged flexion creates:
 - ↑ full flexion angle
 - Delayed reflex muscle activation
 - ↓ resistance to bending
 - Delayed FR phenomena

Negative Effects of Prolonged Flexion

- ↑ Flexion of the lumbar spine in sitting = ↑ Forward Head⁵⁻⁶
- ↑ Forward head correlated with neck pain⁷⁻⁸



Sitting Postures

Compared to the ideal sitting posture: lumbo-pelvic upright sitting (LPUS)

Slumped Sitting (SS)

Posterior rotation of the pelvis

Thoraco-lumbar relaxed

Look straight ahead



Slumped Sitting (SS)

Alignment^{5,9}

- ↑ Thoracic and lumbar flexion
- ↑ Forward Head

Muscle Activation^{5,9-11}

- ↑ Thoracic and cervical erector spinae
- ↓ Multifidi, internal oblique and transverse abdominus



Slumped Sitting

Thoracic Upright Sitting (TUS)

Anterior rotation of the pelvis

Thoraco-lumbar extension

Shoulder blades retracted

Thoracic Upright Sitting (TUS)

Alignment⁵

- ↑ Thoracic flexion and lumbar extension
- ↓ Forward head

Muscle Activation⁹

- ↓ Cervical erector spinae
- ↑ Thoracic erector spinae
- ↓ Multifidi, internal oblique



Thoracic Upright Sitting

Lumbo-pelvic Upright Sitting (LPUS)

Anterior rotation of the pelvis

Neutral lordosis

Relaxed thorax

Lumbo-pelvic Upright Sitting (LPUS)

Alignment⁵

- ↓ Lumbar flexion and thoracic flexion v. SS
- ↓ Forward head v. SS

Muscle Activation^{5,9-11}

- ↓ Thoracic erector spinae v. TUS
- ↓ Cervical erector spinae v. SS
- ↑ Multifidi, internal oblique, and transverse abdominis v. SS and TUS



Lumbo-Pelvic Upright Sitting

LPUS: The Ideal Sitting Posture

- Least amount of lumbar flexion
 - Decreased stiffness
 - Decreased creep
- Least amount of activation by erector spinae muscle group
- Requires awareness
- Requires endurance activation of multifidi, transverse abdominis (TrA) and internal oblique

Intervention

Strategies for combating the negative effects of sitting.



Postural Awareness

- Educate patients on LPUS and how to attain the posture.
- Educate patients to deliberately perform postural checks often.
- Study by Park SY et al¹² demonstrates that when a subject is continuously aware of their posture they will demonstrate less trunk flexion and more activation of the internal obliques.
- Strengthen for endurance the patient's internal obliques and transverse abdominis.

Postural Awareness: Facts

- No significant differences in lumbar flexion angles or muscle activation have been found between using a physioball or an office chair for sitting.¹³



- Adding a lumbar roll decreases forward head.¹⁴



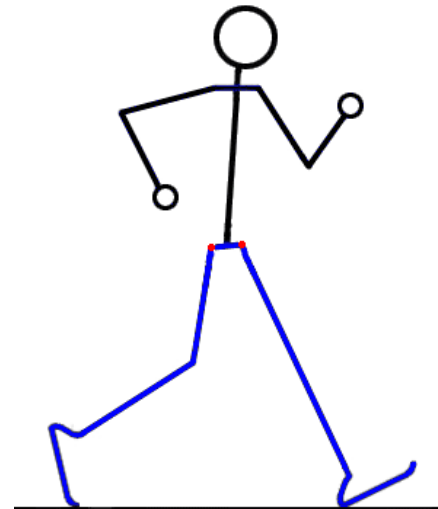
What if I do not
maintain LPUS all
day????



Movement Therapy



Walking Program



How can we help
those that sit for their
occupation?

What are the negative impacts of sitting on my spine?

↑ Stiffness on the front of your spine - ↑ Stretch on the back of your spine

- Stiffness is associated with spine pain.
- Stiffness in the front of your spine can create pressure along your spine's nerves along the back of your spine.
- ↑ stretch on the back of the spine can ↑ your risk for injury with bending over or lifting

Your head moves forward creating stress on the neck. This posture is associated with neck pain.



What are the different sitting postures and which is best for my spine?

Slumped Sitting (SS)

- ↑ stiffness on the front of your spine
- ↑ stretch on the back of your spine
- Associated with your head moving forward
- Our spine does this during prolonged sitting

Extreme Upright Sitting (EUS)

- Sitting upright – Tummy pulled up and in – Chest out/Shoulder blades pinched together

Upright Sitting with Relaxed Upper Back (USRUB)

- Sitting up straight – Tummy pulled up and in – Relaxed Upper Back
- Chin tucked
- ↓ stiffness in front of spine
- ↓ stretch in back of spine
- ↓ head moving forward
- ↑ activation of core muscles
- **MOST IDEAL POSTURE!!!!!!**

Fight It !!

Combat Negative Impact of Sitting with Exercise

1. Postural Awareness

- Every so often perform a postural check. Are you in the correct postural position? No?? Fix it!

2. Core Strengthening

- Your transverse abdominus (TrA) is activated during proper sitting.
- Strengthen your TrA by lying on your back and pulling your navel up and towards your spine (flattening out your back). Hold for 5 seconds x10 x3 daily.



3. ↑ Spine Mobility

- Stretch the back in the opposite directions as sitting as shown above. Hold 5-7 sec x5-7 times.

4. ↑ Exercise

- Walking encourages the opposite movement patterns as sitting. Start a walking program today!
- Begin walking 10-20 min a day, 5-6x a wk.
- Increase 5 min every 2 wk until walking 45 min daily.

5. Change Work Habits

- Break up your sitting with standing and walking

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Spine Health and Sitting

Minimizing the negative impact of sitting on the spine with postural correction, education, and exercise.

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