

**The Global Spine Care Initiative: care pathway for people with spine-related concerns**  
**Online Supplemental File**

Fig.1 Guiding principles for the GSCI Care Pathway

The GSCI spine care pathway must:

1. Be sufficiently simple for clinical application.
2. Be person-centered and focus on a person with symptoms or concerns who is seeking information or care
3. Be succinct to allow for educational tools that outline steps and therefore can be applied in a clinical setting.
4. Be appropriate so it can be used by anyone interested in reducing the impact of spinal disorders (e.g., Patients, caregivers, clinicians with different levels of training, discipline or specialty, researchers, government agencies and other stakeholders).
5. Be pertinent to people presenting with any spine-related symptom, all regions of the spine and incorporating all potential psychological and social factors, pathologies, and patient concerns.
6. Include recommended evidence-based interventions for all classes of spinal disorders
7. Be sufficiently applicable to be included in a model of care which could be implemented in communities with different levels of resources.
8. Allow for integration of care between clinicians with different levels of training and skill in the management of spinal disorders within existing health systems.

## Care Pathway Tables

Evidence-based interventions were matched for classes 0 through V of the GSCI Classification article. The Classification differentiates patients according to presenting symptoms that could include pain, neurological deficits or deformity.( see Online Resource Figures 1 to 7 for care pathway tables.)

### LEGEND

“Minimal”, “Mild”, “Moderate” and “Severe” pain is based on a 10 point or culturally equivalent pain scale (Jones et al) plus one or more of the validated spine impairment or disability scales (Oswestry, Roland-Morris, PROMIS, SF-36 etc.). The 50 point NIH Research Task Force Impact Stratification score (NIH-RTF) combines pain intensity, pain interference with normal activities, and functional status, and is felt to be a better indication of the impact of spine pain but is currently less widely used. For the purpose of these table the following definitions should be considered: No or Minimal Pain (numeric pain scale = 0 or 1, Impairment or disability scale = no disability, NIH-RTF Impact Scale = < 8); Mild Pain (numeric pain scale = 2 – 4, Impairment or disability scale = lowest one third, NIH-RTF = 8-27); Moderate Pain (numeric pain scale = 5 -7, Impairment or disability scale = middle one third, NIH-RTF = 28-34); Severe Pain (numeric pain scale = 8-10, Impairment or disability scale = highest one third, NIH-RTC = 35-50). “Acute” less than 3 months and “Chronic” greater than 3 months. Since patient presentation can vary greatly, the definition of these terms for clinical purposes requires a level of clinical judgment.

<b>No or minimal spine-related symptoms                      person has concerns about developing symptoms,                      or is requesting information on the prevention of spinal pathology, spinal pain, or spine-related disability                      (Class 0)</b>	
<b>Triage Screening Questions</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Are there any risk factors?</li> <li><input type="checkbox"/> Are there any symptoms?</li> <li><input type="checkbox"/> If any symptoms, do they interfere with function or activities?</li> </ul>	
<b>No evidence of risk factors for spine disorders or pain                      No interference with function                      Class 0a</b>	<b>One or more risk factors for spine disorders or pain                      No interference with function                      Class 0b</b>
<u>Assessments</u> <ul style="list-style-type: none"> <li>• Brief history to identify concern</li> <li>• Based upon patient characteristics, identify if there are any unrecognized risk factors</li> </ul> <u>Interventions</u> <ul style="list-style-type: none"> <li>• Education about primary prevention for any risk factors (e.g., injury prevention, diet and physical activity advice for osteoporosis prevention)</li> <li>• Provide education on management of co-morbidities</li> </ul>	<u>Assessments</u> <ul style="list-style-type: none"> <li>• Brief history to identify concern</li> <li>• Clinical examination if needed</li> <li>• Based upon patient characteristics, screen for any risk factors (e.g., osteoporosis)</li> <li>• Assess for red flags</li> <li>• Assess for psychosocial flags</li> </ul> <u>Interventions</u> <ul style="list-style-type: none"> <li>• Educate about condition, reassurance, advice to remain active, and self-care instructions</li> <li>• Address any psychosocial flags</li> <li>• Education about primary prevention for any risk factors detected (e.g., injury prevention, diet advice for osteoporosis prevention)</li> <li>• Provide education on management of co-morbidities</li> </ul>

<b>Mild Spinal Pain (2 to 4/10 numeric pain scale) (Class I)</b>			
<u>Triage Screening Questions</u>			
<input type="checkbox"/> Is pain acute/subacute (less than 3 months) or recurrent or chronic (> 3 months)? <input type="checkbox"/> Does pain interfere with function or activities? <input type="checkbox"/> Are there any neurological deficits? <input type="checkbox"/> Are there any signs of serious or systemic pathology (red flags)?			
<b>Acute/subacute</b> <b>No or minimal interference with function or activities</b> <b>No neurologic deficits</b> <b>No serious or systemic pathology (no red flags)</b>  <b>Class Ia</b>		<b>Chronic or recurrent</b> <b>No or minimal interference with function or activities</b> <b>No neurologic deficits</b> <b>No serious or systemic pathology (no red flags)</b>  <b>Class Ib</b>	
<u>Assessments</u>		<u>Assessments</u>	
<ul style="list-style-type: none"> <li>• History and clinical examination</li> <li>• Assess for psychosocial flags</li> <li>• Assess for risk factors and comorbidities</li> </ul>		<ul style="list-style-type: none"> <li>• History and clinical examination</li> <li>• Assess for psychosocial flags</li> <li>• Assess for risk factors and comorbidities</li> </ul>	
<u>Interventions</u>		<u>Interventions</u>	
<u>Provider-delivered care</u>	<u>Recommended Self-care</u>	<u>Provider-delivered care</u>	<u>Recommended Self-care</u>
<ul style="list-style-type: none"> <li>• Educate about condition, reassurance, advice to remain active, and self-care instructions</li> <li>• Manual therapy (short-term)</li> <li>• Acupuncture (short-term)</li> <li>• Supervised psychosocial therapy</li> <li>• Non-opioid analgesics/muscle relaxants (short-term)</li> <li>• Educate about prevention</li> <li>• Manage/track risk factors/comorbidities</li> </ul>	<ul style="list-style-type: none"> <li>• Therapeutic exercise</li> <li>• Heat/cold (home use)</li> <li>• Psychosocial self-care</li> <li>• Prevention</li> </ul>	<ul style="list-style-type: none"> <li>• Educate about condition, reassurance, advice to remain active, and self-care instructions</li> <li>• Manual therapy (short-term)</li> <li>• Acupuncture (short-term)</li> <li>• Supervised psychosocial therapy</li> <li>• Non-opioid analgesics/muscle relaxants (short-term)</li> <li>• Educate about prevention</li> <li>• Manage/track risk factors/comorbidities</li> </ul>	<ul style="list-style-type: none"> <li>• Therapeutic exercise</li> <li>• Heat/cold (home use)</li> <li>• Mind-body therapies</li> <li>• Psychosocial self-care</li> <li>• Prevention</li> </ul>

<b>Moderate spinal pain (5 to 7/10 numeric pain scale) (Class II)</b>			
<u>Triage Screening Questions</u>			
<input type="checkbox"/> Is pain acute/subacute (less than 3 months) or recurrent or chronic (> 3 months)? <input type="checkbox"/> Does pain interfere with function or activities? <input type="checkbox"/> Are there any neurological deficits? <input type="checkbox"/> Are there any signs of serious or systemic pathology (red flags)?			
<b>Acute or subacute</b> <b>Interference with function or activities, but not incapacitating</b> <b>No neurologic deficits</b> <b>No serious or systemic pathology (no red flags)</b> <b>Class IIa</b>		<b>Chronic or recurrent</b> <b>Interference with function or activities, but not incapacitating</b> <b>No neurologic deficits,</b> <b>No serious or systemic pathology (no red flags)</b> <b>Class IIb</b>	
<u>Assessments</u>		<u>Assessments</u>	
<ul style="list-style-type: none"> <li>History, clinical examination</li> <li>Assess for psychosocial flags</li> <li>Assess for risk factors and comorbidities</li> </ul>		<ul style="list-style-type: none"> <li>History, clinical examination.</li> <li>Assess for psychosocial flags</li> <li>Assess for risk factors and comorbidities</li> <li>Diagnostic imaging (if not done previously)</li> </ul>	
<u>Interventions</u>		<u>Interventions</u>	
Provider-delivered care	Recommended Self-care	Provider-delivered care	Recommended Self-care
<ul style="list-style-type: none"> <li>Educate about condition, reassurance, advice to remain active, and self-care instructions</li> <li>Manual therapy (short-term)</li> <li>Acupuncture (short-term)</li> <li>Supervised psychosocial therapy</li> <li>Non-opioid analgesics/muscle relaxants (short-term)</li> <li>Opioid analgesics (short-term and only if other interventions are not controlling pain)</li> <li>Educate about prevention</li> <li>Manage/track risk factors/comorbidities</li> </ul>	<ul style="list-style-type: none"> <li>Therapeutic exercise</li> <li>Heat/cold (home use)</li> <li>Psychosocial self-care</li> <li>Prevention</li> </ul>	<ul style="list-style-type: none"> <li>Educate about condition, reassurance, advice to remain active, and self-care instructions</li> <li>Manual therapy (short-term)</li> <li>Acupuncture (short-term)</li> <li>Supervised psychosocial therapy</li> <li>Non-opioid analgesics/muscle relaxants (short-term)</li> <li>Antidepressants</li> <li>Inter/multidisciplinary team care</li> <li>Educate about prevention</li> <li>Manage/track risk factors/comorbidities</li> </ul>	<ul style="list-style-type: none"> <li>Therapeutic exercise</li> <li>Heat/cold (home use)</li> <li>Mind-body therapies</li> <li>Psychosocial self-care</li> <li>Prevention</li> </ul>

Severe Spinal pain (8 to 10/10 numeric pain scale) (Class II)			
<u>Triage Screening Questions</u>			
<input type="checkbox"/> Is pain acute/subacute (less than 3 months) or recurrent or chronic (> 3 months)? <input type="checkbox"/> Does pain interfere with function or activities? <input type="checkbox"/> Are there any neurological deficits? <input type="checkbox"/> Are there any signs of serious or systemic pathology (red flags)?			
<b>Acute or subacute</b> <b>Interference with function or activities, which is incapacitating</b> <b>No neurologic deficits</b> <b>No serious or systemic pathology (no red flags)</b> <b>Class IIc</b>		<b>Chronic or recurrent</b> <b>Interference with function or activities, which is incapacitating</b> <b>No neurologic deficits</b> <b>No serious or systemic pathology (no red flags)</b> <b>Class IId</b>	
<u>Assessments</u>		<u>Assessments</u>	
<ul style="list-style-type: none"> <li>• History, clinical examination.</li> <li>• Assess for psychosocial flags</li> <li>• Assess for risk factors and comorbidities</li> <li>• Diagnostic imaging (if not done previously)</li> </ul>		<ul style="list-style-type: none"> <li>• History, clinical examination.</li> <li>• Assess for psychosocial flags</li> <li>• Assess for risk factors and comorbidities</li> <li>• Diagnostic imaging (if not done previously)</li> </ul>	
<u>Interventions</u>		<u>Interventions</u>	
<u>Provider-delivered care</u>	<u>Recommended Self-care</u>	<u>Provider-delivered care</u>	<u>Recommended Self-care</u>
<ul style="list-style-type: none"> <li>• Educate about condition, reassurance, advice to remain active, and self-care instructions</li> <li>• Manual therapy (short-term)</li> <li>• Acupuncture (short-term)</li> <li>• Supervised psychosocial therapy</li> <li>• Non-opioid analgesics/muscle relaxants (short-term)</li> <li>• Opioid analgesics (short-term and only if other interventions are not controlling pain)</li> <li>• Educate about prevention</li> <li>• Manage/track risk factors/comorbidities</li> </ul>	<ul style="list-style-type: none"> <li>• Therapeutic exercise</li> <li>• Psychosocial self-care</li> <li>• Prevention</li> </ul>	<ul style="list-style-type: none"> <li>• Educate about condition, reassurance, advice to remain active, and self-care instructions</li> <li>• Manual therapy (short-term)</li> <li>• Acupuncture (short-term)</li> <li>• Supervised psychosocial therapy</li> <li>• Non-opioid analgesics/muscle relaxants (short-term)</li> <li>• Antidepressants</li> <li>• Inter/multidisciplinary team care</li> <li>• Educate about prevention</li> <li>• Manage/track risk factors/comorbidities</li> <li>• Surgery (if unresponsive to other interventions and surgical lesion confirmed)</li> </ul>	<ul style="list-style-type: none"> <li>• Therapeutic exercise</li> <li>• Mind-body therapies</li> <li>• Psychosocial self-care</li> <li>• Prevention</li> </ul>

Spine-related neurological symptoms or deficits causing Interference with function or activities (Class III)					
Triage Screening Questions					
<input type="checkbox"/> Are neurological symptoms acute (recent) or chronic (longstanding)? <input type="checkbox"/> Have the neurological symptoms been getting worse? <input type="checkbox"/> Are there any signs of serious or systemic pathology (red flags)?					
Minor and non-progressive No red flags for serious or systemic disease Class IIIa		Acute, major or progressive No red flags for serious or systemic disease Class IIIb		Chronic, stable No red flags for serious or systemic disease Class IIIc	
Assessments		Assessments		Assessments	
<ul style="list-style-type: none"> <li>History, clinical examination.</li> <li>Assess for psychosocial flags</li> <li>Assess for risk factors and comorbidities</li> <li>Diagnostic imaging (if not done previously)</li> <li>Laboratory testing (if signs of systemic disease)</li> </ul>		<ul style="list-style-type: none"> <li>History, clinical examination.</li> <li>Assess for psychosocial flags</li> <li>Assess for risk factors and comorbidities</li> <li>Emergency imaging (if appropriate and available)</li> <li>Laboratory testing (if signs of systemic disease)</li> </ul>		<ul style="list-style-type: none"> <li>History, clinical examination</li> <li>Assess for psychosocial flags</li> <li>Assess for risk factors and comorbidities</li> <li>Diagnostic imaging (if not done previously)</li> <li>Laboratory testing (if signs of systemic disease)</li> </ul>	
Interventions		Interventions		Interventions	
Provider-delivered care	Recommended Self-care	Provider-delivered care	Recommended Self-care	Provider-delivered care	Recommended Self-care
<ul style="list-style-type: none"> <li>Educate about condition, reassurance, advice to remain active, and self-care instructions</li> <li>Manual therapy (short-term)</li> <li>Supervised psychosocial therapy</li> <li>Educate about prevention</li> <li>Manage/track risk factors/comorbidities</li> <li>Elective decompression surgery (if no spontaneous recovery with time)</li> </ul>	<ul style="list-style-type: none"> <li>Therapeutic exercise</li> <li>Psychosocial self-care</li> <li>Prevention</li> </ul>	<ul style="list-style-type: none"> <li>Educate about condition, reassurance, advice to remain active, and self-care instructions</li> <li>Supervised psychosocial therapy</li> <li>Non-opioid analgesics/muscle relaxants (short-term)</li> <li>Opioid analgesics (short-term) (only if other interventions are not controlling pain)</li> <li>Educate about prevention</li> <li>Manage/track risk factors/comorbidities</li> <li>Inter/multidisciplinary team care</li> <li>Emergency referral (if surgical decompression indicated)</li> </ul>	<ul style="list-style-type: none"> <li>Therapeutic exercise</li> <li>Psychosocial self-care</li> <li>Prevention</li> </ul>	<ul style="list-style-type: none"> <li>Educate about condition, reassurance, advice to remain active, and self-care instructions</li> <li>Manual therapy (short-term)</li> <li>Supervised psychosocial therapy</li> <li>Non-opioid analgesics/muscle relaxants (short-term)</li> <li>Opioid analgesics (short-term) (only if other interventions are not controlling pain)</li> <li>Antidepressants</li> <li>Educate about prevention</li> <li>Manage/track risk factors/comorbidities</li> <li>Inter/multidisciplinary team care</li> <li>Elective decompression surgery (if no recovery with time)</li> </ul>	<ul style="list-style-type: none"> <li>Therapeutic exercise</li> <li>Mind-body therapy</li> <li>Psychosocial self-care</li> <li>Prevention</li> </ul>

<b>Severe structural bony spinal deformity, fracture or instability</b> <b>With or without interference with function or activities</b> <b>With or without neurological deficits</b>  <b>(Class IV)</b>			
<u>Triage Screening Questions</u> <ul style="list-style-type: none"> <li><input type="checkbox"/> Is the deformity stable?</li> <li><input type="checkbox"/> Is the deformity acute (recent) or chronic (longstanding)?</li> <li><input type="checkbox"/> Are there any symptoms related to the deformity?</li> <li><input type="checkbox"/> Are there any signs of serious or systemic pathology (red flags)?</li> </ul>			
<b>Stable, no related symptoms</b> <b>No serious or systemic disease (no red flags)</b> <b>Class IVa</b>		<b>Symptoms related to spine-related concern</b> <b>Acute (e.g., fracture) or chronic (e.g., scoliosis or instability)</b> <b>No serious or systemic disease (no red flags)</b> <b>Class IVb</b>	
<u>Assessments</u>		<u>Assessments</u>	
<ul style="list-style-type: none"> <li>• History, clinical examination</li> <li>• Assess for psychosocial flags</li> <li>• Assess for risk factors and comorbidities</li> <li>• Review available imaging (Additional imaging unlikely to be necessary)</li> </ul>		<ul style="list-style-type: none"> <li>• History, clinical examination</li> <li>• Assess for psychosocial flags</li> <li>• Assess for risk factors and comorbidities</li> <li>• Diagnostic imaging</li> <li>•</li> </ul>	
<u>Interventions</u>		<u>Interventions</u>	
Provider-delivered care	Recommended Self-care	Provider-delivered care	Recommended Self-care
<ul style="list-style-type: none"> <li>• Educate about condition, reassurance, benign nature of most degenerative and structural bony changes, advice to remain active, and self-care instructions</li> <li>• Defer symptomatic relief to appropriate Class recommendations for symptoms unrelated to the structural pathology</li> <li>• Educate about prevention</li> <li>• Manage/track risk factors/comorbidities</li> </ul>	<ul style="list-style-type: none"> <li>• Prevention and comorbidity management</li> </ul>	<ul style="list-style-type: none"> <li>• Educate about condition, reassurance</li> <li>• Supervised psychosocial therapy</li> <li>• Non-opioid analgesics (short-term)</li> <li>• Opioids for fracture (short-term, (if necessary)</li> <li>• Bracing for scoliosis or fracture (if indicated by guidelines)</li> <li>• Educate about prevention</li> <li>• Manage/track risk factors/comorbidities</li> <li>• Inter/multidisciplinary team care</li> <li>• Fusion or stabilization surgery, if fracture</li> <li>• Vertebral augmentation surgery, if compression fracture</li> <li>• Deformity surgery if scoliosis per guidelines</li> <li>• Fusion surgery, if confirmed unstable pathology</li> </ul>	<ul style="list-style-type: none"> <li>• Psychosocial self-care</li> <li>• Prevention</li> <li>• Therapeutic exercise (if appropriate for pathology)</li> </ul>

<b>Serious or systemic pathology with spine-related symptoms (Class V)</b>					
<b>Triage Screening Questions</b> <input type="checkbox"/> Is the condition acute? <input type="checkbox"/> Is it progressive? <input type="checkbox"/> Are there any signs of serious or systemic pathology (red flags)?					
<b>Acute and severe Class Va</b>		<b>Slowly progressive Class Vb</b>		<b>Referred from non-spinal pathology Red flags are present Class Vc</b>	
<u>Assessments</u>		<u>Assessments</u>		<u>Assessments</u>	
<ul style="list-style-type: none"> <li>History, clinical examination</li> <li>Diagnostic imaging</li> <li>Assess for risk factors and comorbidities</li> <li>Laboratory testing (for infection, metabolic or inflammatory disorders)</li> </ul>		<ul style="list-style-type: none"> <li>History, clinical examination</li> <li>Diagnostic imaging</li> <li>Assess for risk factors and comorbidities</li> <li>Laboratory testing (for infection, metabolic or inflammatory disorders)</li> </ul>		<ul style="list-style-type: none"> <li>History, clinical examination</li> <li>Diagnostic imaging</li> <li>Assess for risk factors and comorbidities</li> <li>Laboratory testing (for infection, metabolic or inflammatory disorders)</li> </ul>	
<u>Interventions</u>		<u>Interventions</u>		<u>Interventions</u>	
<b>Provider-delivered care</b>	<b>Recommended Self-care</b>	<b>Provider-delivered care</b>	<b>Recommended Self-care</b>	<b>Provider-delivered care</b>	<b>Recommended Self-care</b>
<ul style="list-style-type: none"> <li>Educate about condition, reassurance</li> <li>Non-opioid analgesics/muscle relaxants (short-term)</li> <li>Opioid analgesics (short-term and only if non-opioids ineffective)</li> <li>Inter/multidisciplinary team care</li> <li>Emergency referral to appropriate specialist</li> </ul>	<ul style="list-style-type: none"> <li>Prevention</li> </ul>	<ul style="list-style-type: none"> <li>Educate about condition, reassurance</li> <li>Non-opioid analgesics (short-term)</li> <li>Opioid analgesics (short-term and only if non-opioids ineffective)</li> <li>Educate about prevention</li> <li>Manage/track risk factors/comorbidities</li> <li>Inter/multidisciplinary team care</li> <li>Non-emergent referral to appropriate specialist</li> </ul>	<ul style="list-style-type: none"> <li>Prevention</li> </ul>	<ul style="list-style-type: none"> <li>Educate about condition, reassurance</li> <li>Inter/multidisciplinary team care</li> <li>Emergency referral to appropriate specialist</li> </ul>	<ul style="list-style-type: none"> <li>Prevention</li> </ul>