Bahan Ajar 4

Hernia Nucleus Pulposus

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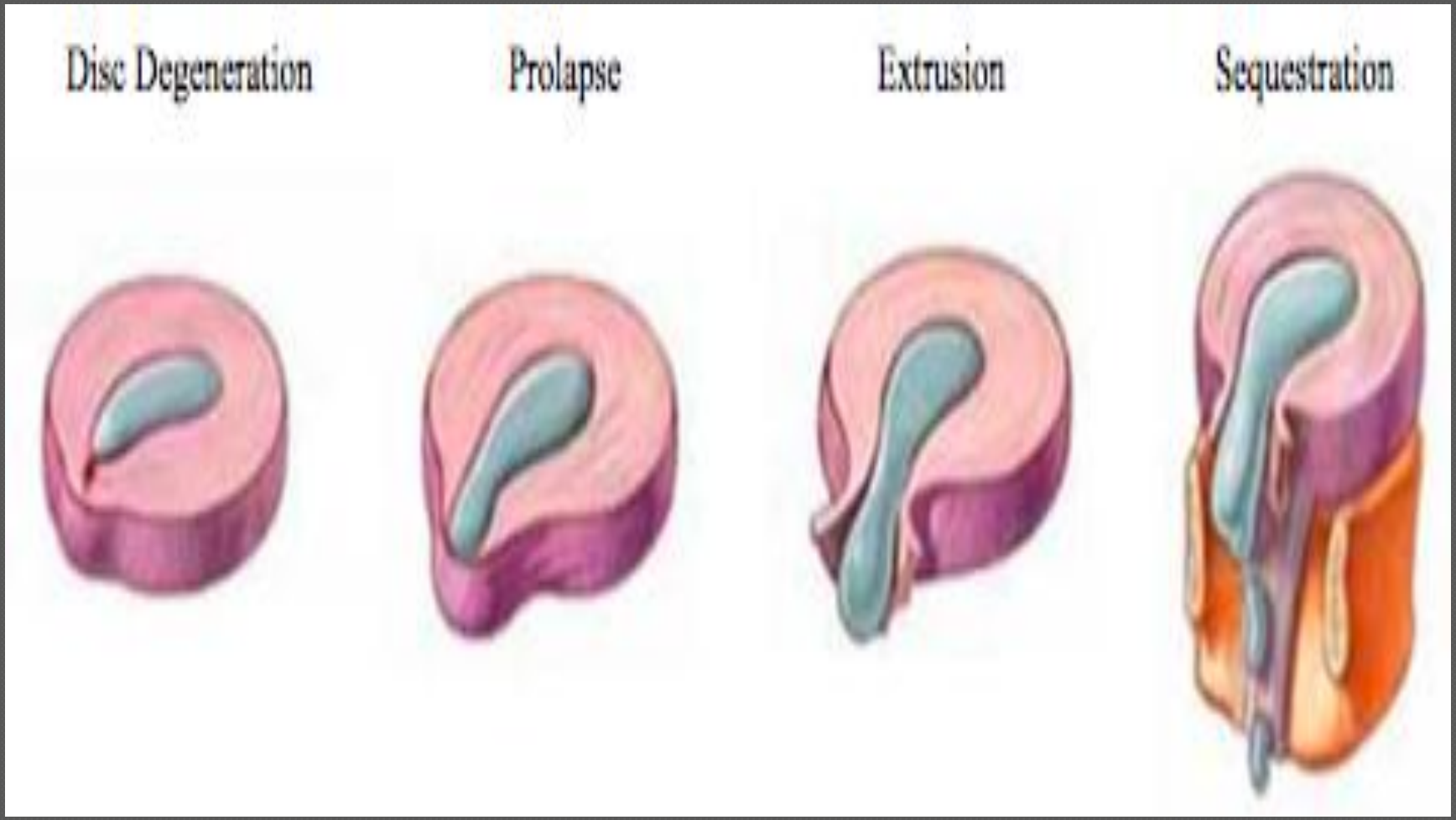
Definisi

Hernia Nucleus Pulposus (HNP) adalah suatu penyakit, → bantalan lunak diantara ruas-ruas tulang belakang (*soft gel disc* atau Nukleus Pulposus) mengalami tekanan dan pecah, → penyempitan dan terjepitnya urat-urat saraf yang melalui tulang belakang kita → nyeri

Klasifikasi

1. Protrusi diskus intervertebralis : nukleus terlihat menonjol ke satu arah tanpa kerusakan annulus fibrosus.
2. Prolaps diskus intervertebral : nukleus berpindah, tetapi masih dalam lingkaran anulus fibrosus.
3. Extrusi diskus intervertebral : nukleus keluar dan anulus fibrosus dan berada di bawah ligamentum, longitudinalis posterior.
4. Sequestrasi diskus intervertebral : nukleus telah menembus ligamentum longitudinalis posterior

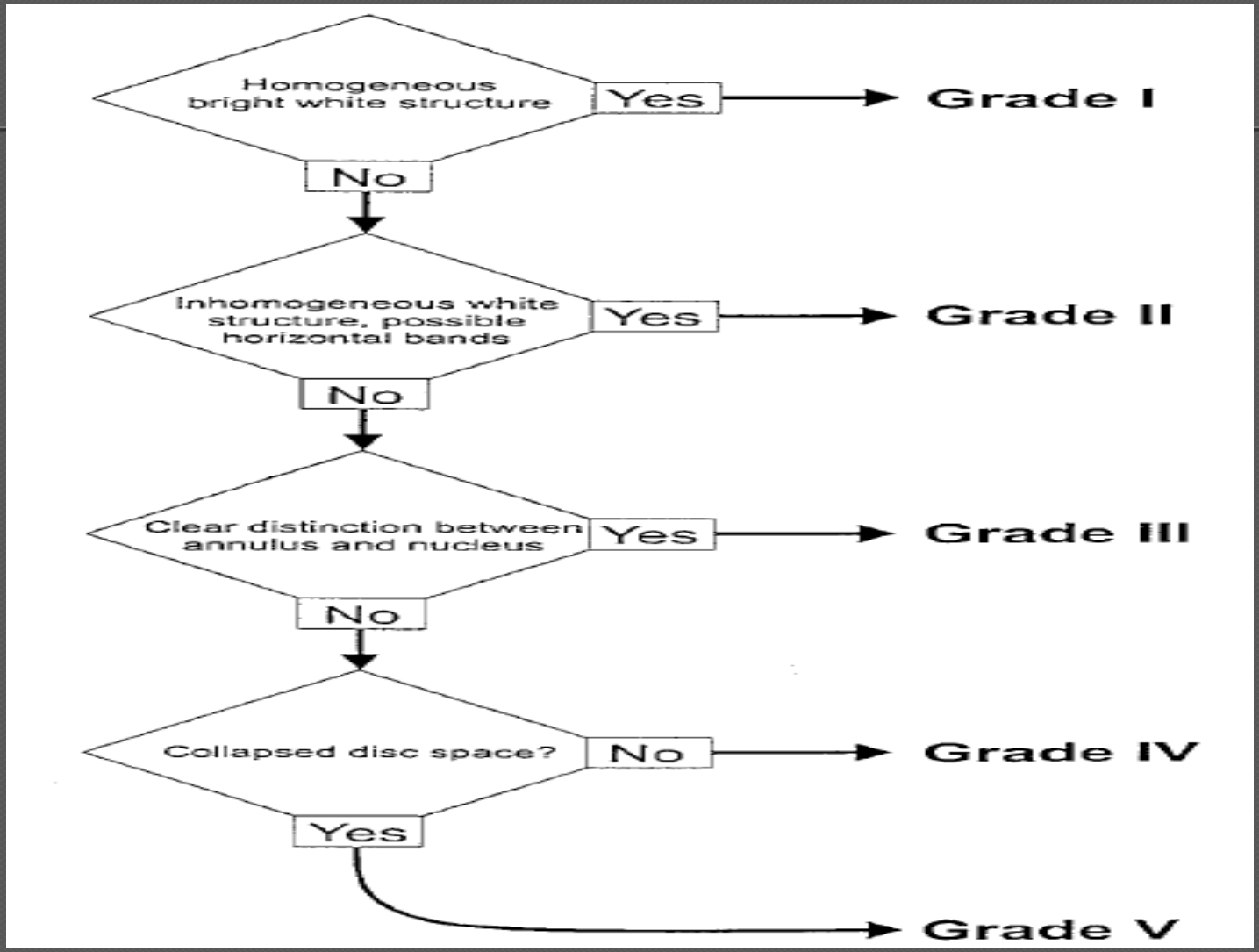

Disc Degeneration
Prolapse
Extrusion
Sequestration

Klasifikasi HNP berdasarkan MRI

Table 1. Classification of Disc Degeneration*

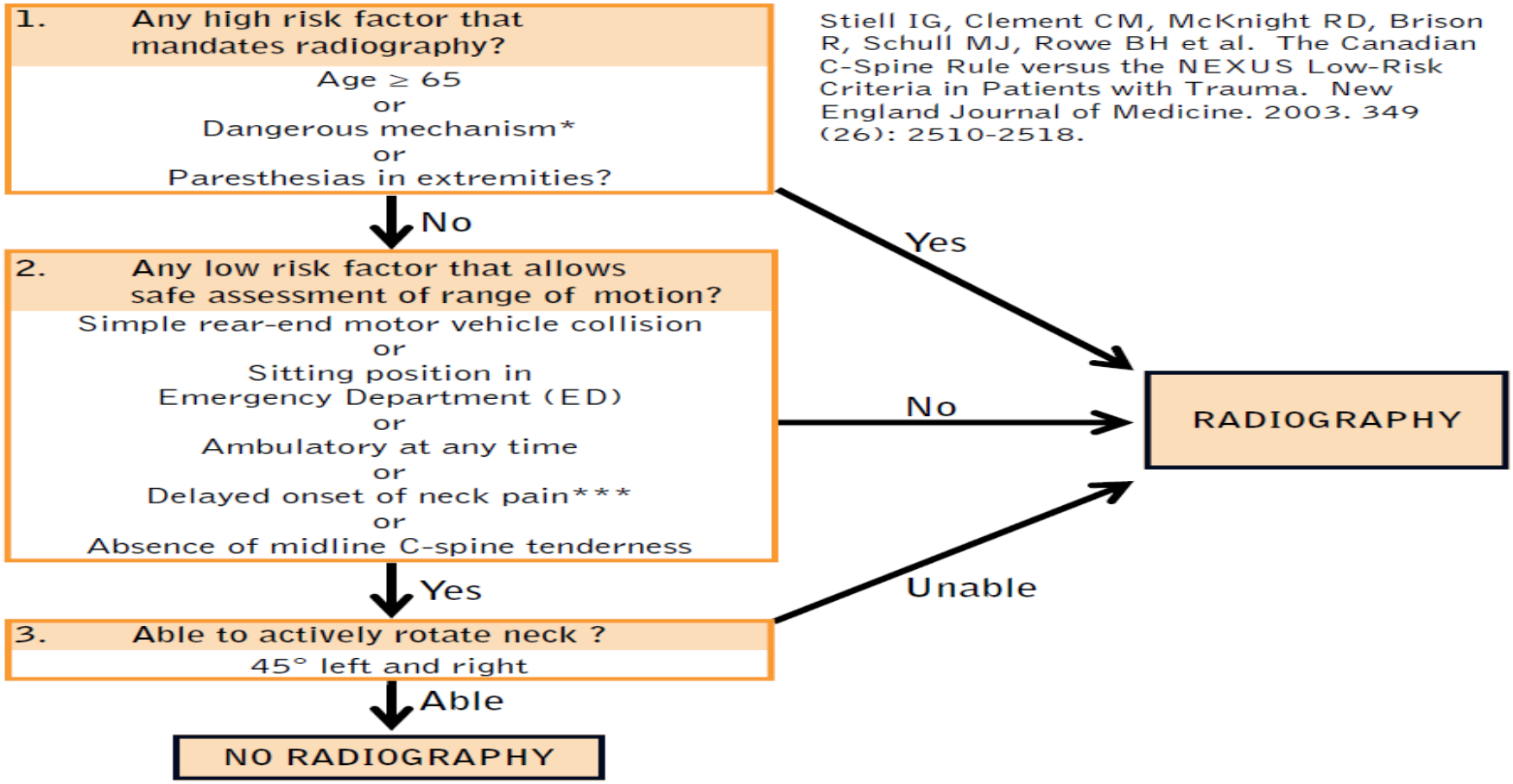
Grade	Structure	Distinction of Nucleus and Anulus	Signal Intensity	Height of Intervertebral Disc
I	Homogeneous, bright white	Clear	Hyperintense, isointense to cerebrospinal fluid	Normal
II	Inhomogeneous with or without horizontal bands	Clear	Hyperintense, isointense to cerebrospinal fluid	Normal
III	Inhomogeneous, gray	Unclear	Intermediate	Normal to slightly decreased
IV	Inhomogeneous, gray to black	Lost	Intermediate to hypointense	Normal to moderately decreased
V	Inhomogeneous, black	Lost	Hypointense	Collapsed disc space

* Modified from Pearce (cited by Eyre et al[9]).


Homogeneous bright white structure
Yes
Grade I
No
Inhomogeneous white structure, possible horizontal bands
Yes
Grade II
No
Clear distinction between annulus and nucleus
Yes
Grade III
No
Collapsed disc space?
No
Grade IV
Yes
Grade V

The Canadian C-Spine Rule (CCR)

Among patients with a traumatic acute neck injury, CCR is effective at identifying those who do not require imaging.



Stiell IG, Clement CM, McKnight RD, Brison R, Schull MJ, Rowe BH et al. The Canadian C-Spine Rule versus the NEXUS Low-Risk Criteria in Patients with Trauma. New England Journal of Medicine. 2003. 349 (26): 2510-2518.

* *Dangerous mechanism*
- fall from elevation ≥ 3 feet/5 stairs
- axial load to head, i.e. diving
- MVC high speed (> 100 km/hr), rollover, ejection
- motorized recreational vehicles
- bicycle struck or collision

** *Simple rear end motor vehicle collision (MVC) excludes*
- being pushed into oncoming traffic
- being hit by bus/large truck
- being hit by high speed vehicle
- a rollover

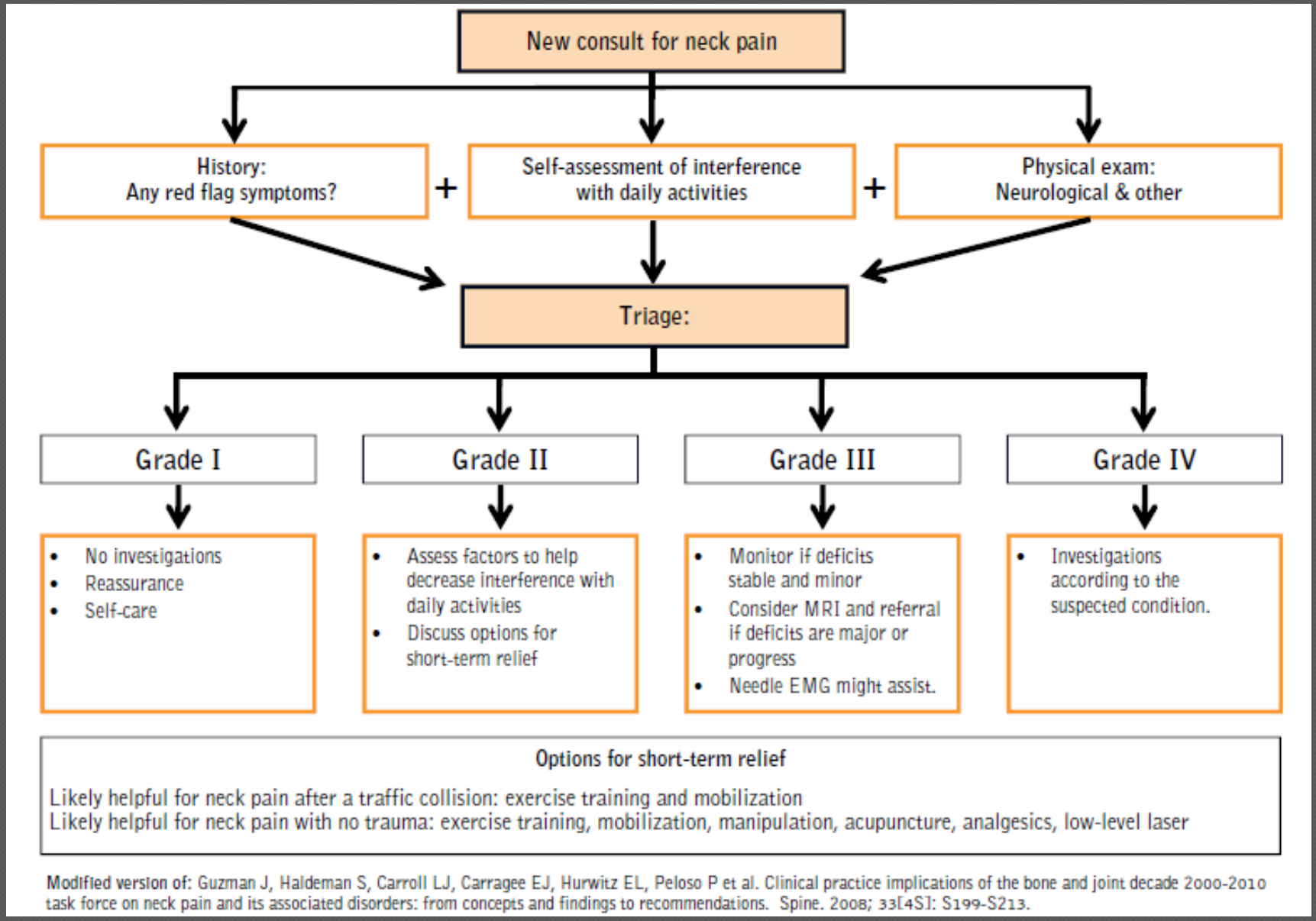
*** *Delayed*
- i.e. no immediate onset of neck pain

Grades of Neck Pain

Table 1: Description of grades (Neck Pain Task Force)

Description	Symptoms/signs	Initial assessment
Grade I No signs of major pathology and no or little interference with daily activities.	• stiffness, tenderness, but no significant neurological complaints • no signs and symptoms of major structural pathology (e.g. fracture, dislocation, infection, etc)	• does not require further imaging or laboratory investigation • reassure patient that serious injury is very unlikely • encourage patients to remain as active as possible and avoid neck immobilization • important to assess prognostic factors
Grade II No signs of major pathology, but interference with daily activities.	• neck pain interference with daily activities • no signs and symptoms of major structural pathology or root compression	• does not require imaging or laboratory investigation • reassure patient that serious structural injury is very unlikely • should be reassessed as needed • important to assess prognostic factors
Grade III Neck pain with neurological signs or symptoms	• complaints of neck pain associated with significant neurologic signs (e.g. decreased deep tendon reflexes, weakness, sensory deficits) • these complaints suggest malfunction of spinal nerves or the spinal cord	• requires closer monitoring to detect any progression of neurologic signs, and should be followed up by primary care clinicians or a specialist • provocation tests can be used to rule out radiculopathy • those with severe incapacitating radicular pain, major neurologic deficits at onset, or progression of deficits should be considered for CT or MRI imaging and referral for a specialty opinion • needle electromyography may be of value in confirming the presence of radiculopathy
Grade IV Neck pain with signs of major pathology	• complaints of neck pain and/or its associated disorders along with signs or symptoms of major structural pathology, detected by clinician • be aware of red flags for fractures, myelopathy, infection, neoplasm, other destructive lesions or systemic diseases	• should undergo expedient investigation tailored to the suspected condition • no single test will be indicated in all circumstances, but radiographs, MRI, bone scan and inflammatory markers in blood might be considered • if initial testing does not rule out major pathology, referral might be indicated

Guzman J, Haldeman S, Carroll LJ, Carragee EJ, Hurwitz EL, Peloso P et al. Clinical practice implications of the bone and joint decade 2000-2010 task force on neck pain and its associated disorders: from concepts and findings to recommendations. Spine. 2008; 33[4S]: S199-S213.



Modified version of: Guzman J, Haldeman S, Carroll LJ, Carragee EJ, Hurwitz EL, Peloso P et al. Clinical practice implications of the bone and joint decade 2000-2010 task force on neck pain and its associated disorders: from concepts and findings to recommendations. Spine. 2008; 33[4S]: S199-S213.

Neck pain treatment

Table 2: Non-invasive neck pain treatment

Grade of neck pain and scenario	Likely helpful	Possibly helpful	Likely not helpful	Not enough evidence *
Grade I and II (acute) traumatic neck pain	Educational video, mobilization, exercises, mobilization plus exercises	Pulsed electromagnetic therapy	Pamphlet/neck booklet alone, passive modalities (heat, cold, diathermy, hydrotherapy), referral to fitness or rehab program, frequent early health-care service, methylprednisolone, passive modalities (ultrasound, TENS), exercise instruction, botulinum toxin A	Manipulation, traction, non-steroidal anti-inflammatory drugs (NSAIDS), other drugs
Grade I and II (non-acute) traumatic neck pain		Supervised exercises, coordinated multidisciplinary care	Passive modalities (TENS, ultrasound), corticosteroid injections	Manipulation, traction, NSAIDs, other drugs
Grade I and II non-traumatic neck pain	Manipulation, mobilization, supervised exercises, manual therapy (manipulation, mobilization, massage) plus exercises, acupuncture, low-level laser therapy, analgesics	Percutaneous neuromuscular therapy, brief intervention using cognitive behavioural principles	Advice alone, collars, passive modalities (heat therapy, ultrasound, TENS, electrical muscle stimulation), exercise instruction, botulinum toxin A	Magnetic stimulation, massage alone, traction, NSAIDS, other drugs
Grade III (suspected cervical radiculopathy)				All interventions

Neck pain treatment

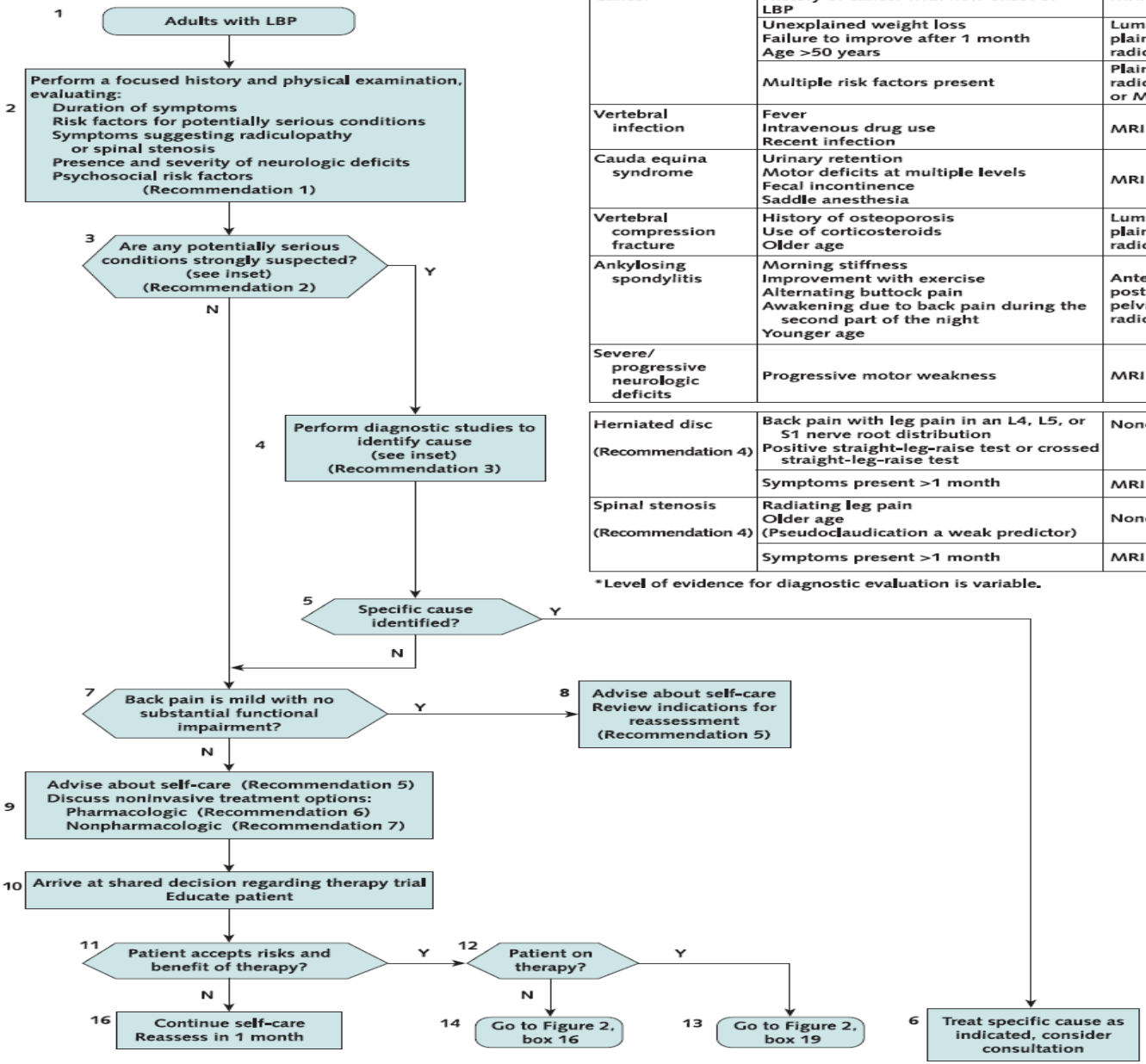
Table 2: Non-invasive neck pain treatment

Grade of neck pain and scenario	Likely helpful	Possibly helpful	Likely not helpful	Not enough evidence *
Cervicogenic headache		Manipulation, mobilization, supervised exercises, manipulation or mobilization plus supervised exercises, water pillow		Passive modalities, traction, NSAIDS, other drugs
Neck pain in workers		Supervised exercises plus strength or endurance training and/or relaxation training with behavioral support	Ergonomic interventions, forced work breaks, rehabilitation programs, stress management programs, relaxation training, physical training, exercise instruction	

Neck pain treatment

Table 3: Invasive neck pain treatment

Grade of neck pain and scenario	Likely helpful	Possibly helpful	Likely not helpful	Not enough evidence *
Grades I and II			Corticosteroid injections to cervical facets	Radio frequency (RF) neurotomy to cervical facets nerves, cervical decompression, anterior cervical fusion, cervical disc replacement
Grade III neck pain with radiculopathy	Discectomy or discectomy with fusion	Trial of a corticosteroid for short-term relief. Discectomy with fusion and instrumentation. Cervical disc replacement (long-term efficacy and safety are unknown)	Heating of the dorsal, root ganglion	
Grade IV major structural pathology	Beyond the task force mandate. Aggressive surgical treatment of many of these conditions is generally accepted as effective and often strongly advised. Readers should refer to literature of specific pathological conditions.			



Diagnostic Work-up

Possible cause	Key features on history or physical examination	Imaging*	Additional studies*
Cancer	History of cancer with new onset of LBP	MRI	ESR
	Unexplained weight loss Failure to improve after 1 month Age >50 years	Lumbosacral plain radiography	
	Multiple risk factors present	Plain radiography or MRI	
Vertebral infection	Fever Intravenous drug use Recent infection	MRI	ESR and/or CRP
Cauda equina syndrome	Urinary retention Motor deficits at multiple levels Fecal incontinence Saddle anesthesia	MRI	None
Vertebral compression fracture	History of osteoporosis Use of corticosteroids Older age	Lumbosacral plain radiography	None
Ankylosing spondylitis	Morning stiffness Improvement with exercise Alternating buttock pain Awakening due to back pain during the second part of the night Younger age	Anterior-posterior pelvis plain radiography	ESR and/or CRP, HLA-B27
Severe/progressive neurologic deficits	Progressive motor weakness	MRI	Consider EMG/NCV
Herniated disc (Recommendation 4)	Back pain with leg pain in an L4, L5, or S1 nerve root distribution Positive straight-leg-raise test or crossed straight-leg-raise test	None	None
	Symptoms present >1 month	MRI	Consider EMG/NCV
Spinal stenosis (Recommendation 4)	Radiating leg pain Older age (Pseudoclaudication a weak predictor)	None	None
	Symptoms present >1 month	MRI	Consider EMG/NCV

*Level of evidence for diagnostic evaluation is variable.

Do not use this algorithm for back pain associated with major trauma, nonspinal back pain, or back pain due to systemic illness. CRP = C-reactive protein; EMG = electromyography; ESR = erythrocyte sedimentation rate; MRI = magnetic resonance imaging; NCV = nerve conduction velocity.

Summary of the clinical examination of the thoracic spine

History

Pain

What made the pain come on?

- Injury?
  - Bony problem
- Spontaneous onset?
  - Disc lesion
  - Arthritis
  - Tumour
- Forceful activity?
  - Muscular lesion

Where was the pain at the beginning/where did it spread or shift to/where is it now?

- Interscapular above T6?
  - Cervical problem
  - Shoulder girdle
  - Thoracic lesion
- Interscapular below T6?
  - Thoracic lesion
- Base of the neck?
  - Costovertebral
  - First rib
  - Sternoclavicular
- Shifting pain?
  - Disc
- Increasing or expanding pain?
  - Tumour

Is the pain influenced by coughing, sneezing or a deep inspiration?

Paraesthesia

- Multisegmental/lower limbs?
  - Cord compression
- Segmental?
  - Root compression
- Undefined?
  - Other neurological disorder

Anticoagulant treatment and bleeding disorders

Inspection

Functional examination

Standing

- 3 dural tests
  - Taking a deep breath
  - Flexion of the neck
  - Shoulders backwards
- 6 active trunk movements
  - Anteflexion
  - Extension
  - Left side flexion
  - Right side flexion
  - Left rotation
  - Right rotation

Sitting

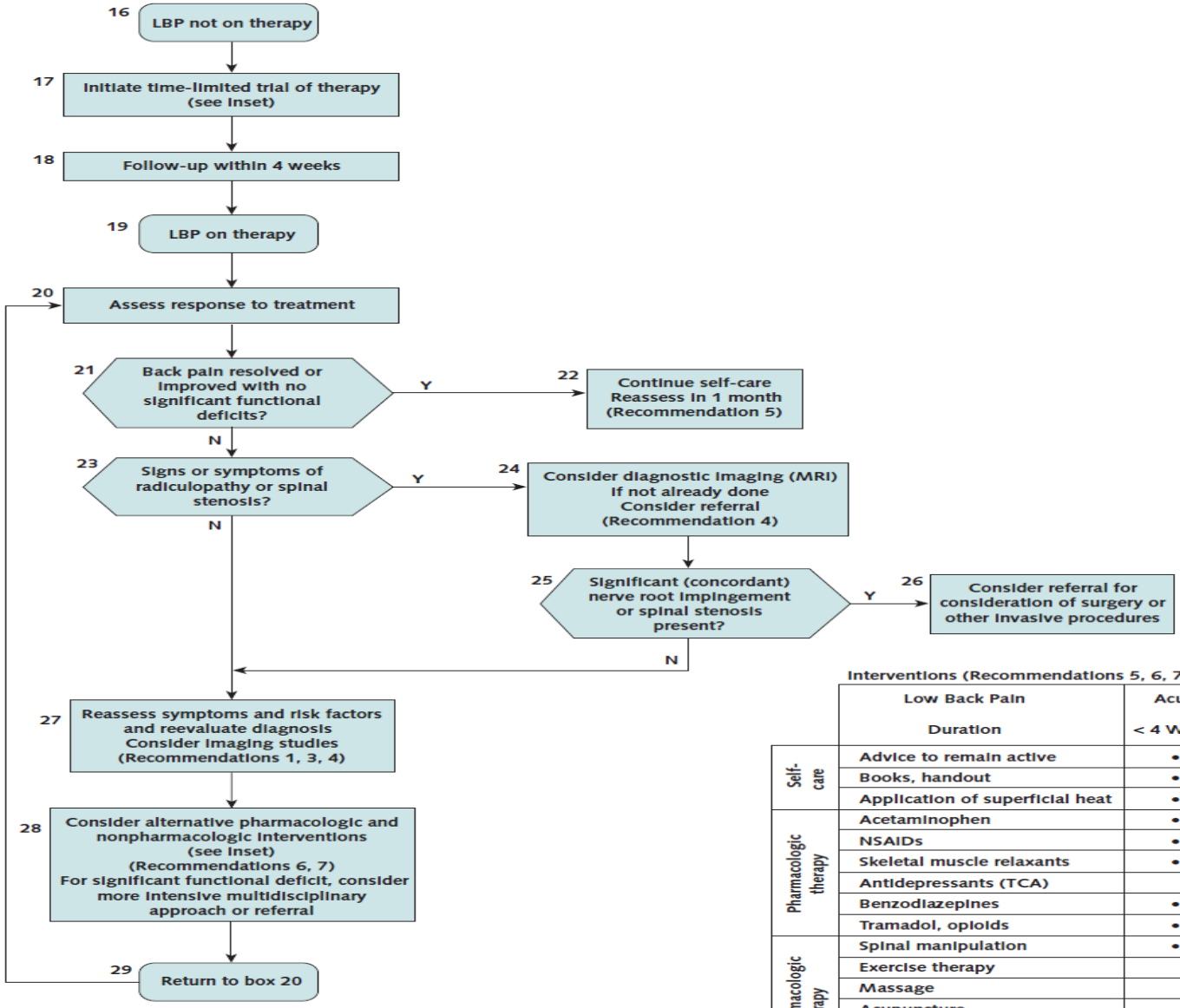
- 2 passive tests
  - Passive left rotation (+ neck flexion)
  - Passive right rotation (+ neck flexion)
- 2 resisted tests
  - Resisted left rotation
  - Resisted right rotation
- Cord sign
  - Plantar reflex

Lying prone

- Location of the affected level by passive extension thrusts

Accessory tests

- Stretching the T1 nerve root
- Resisted movements of the trunk
- Testing the long thoracic nerve
- Oscillation of a rib
- Neurological examination
- Palpation



Interventions (Recommendations 5, 6, 7)

	Low Back Pain Duration	Acute < 4 Weeks	Subacute or Chronic > 4 Weeks
Self-care	Advice to remain active	•	•
	Books, handout	•	•
	Application of superficial heat	•	
Pharmacologic therapy	Acetaminophen	•	•
	NSAIDs	•	•
	Skeletal muscle relaxants	•	
	Antidepressants (TCA)		•
	Benzodiazepines	•	•
	Tramadol, opioids	•	•
Nonpharmacologic therapy	Spinal manipulation	•	•
	Exercise therapy		•
	Massage		•
	Acupuncture		•
	Yoga		•
	Cognitive-behavioral therapy		•
	Progressive relaxation		•
	Intensive interdisciplinary rehabilitation		•

• Interventions supported by grade B evidence (at least fair-quality evidence of moderate benefit, or small benefit but no significant harms, costs, or burdens). No intervention was supported by grade A evidence (good-quality evidence of substantial benefit).

MRI = magnetic resonance imaging; NSAIDs = nonsteroidal anti-inflammatory drugs; TCA = tricyclic antidepressants.

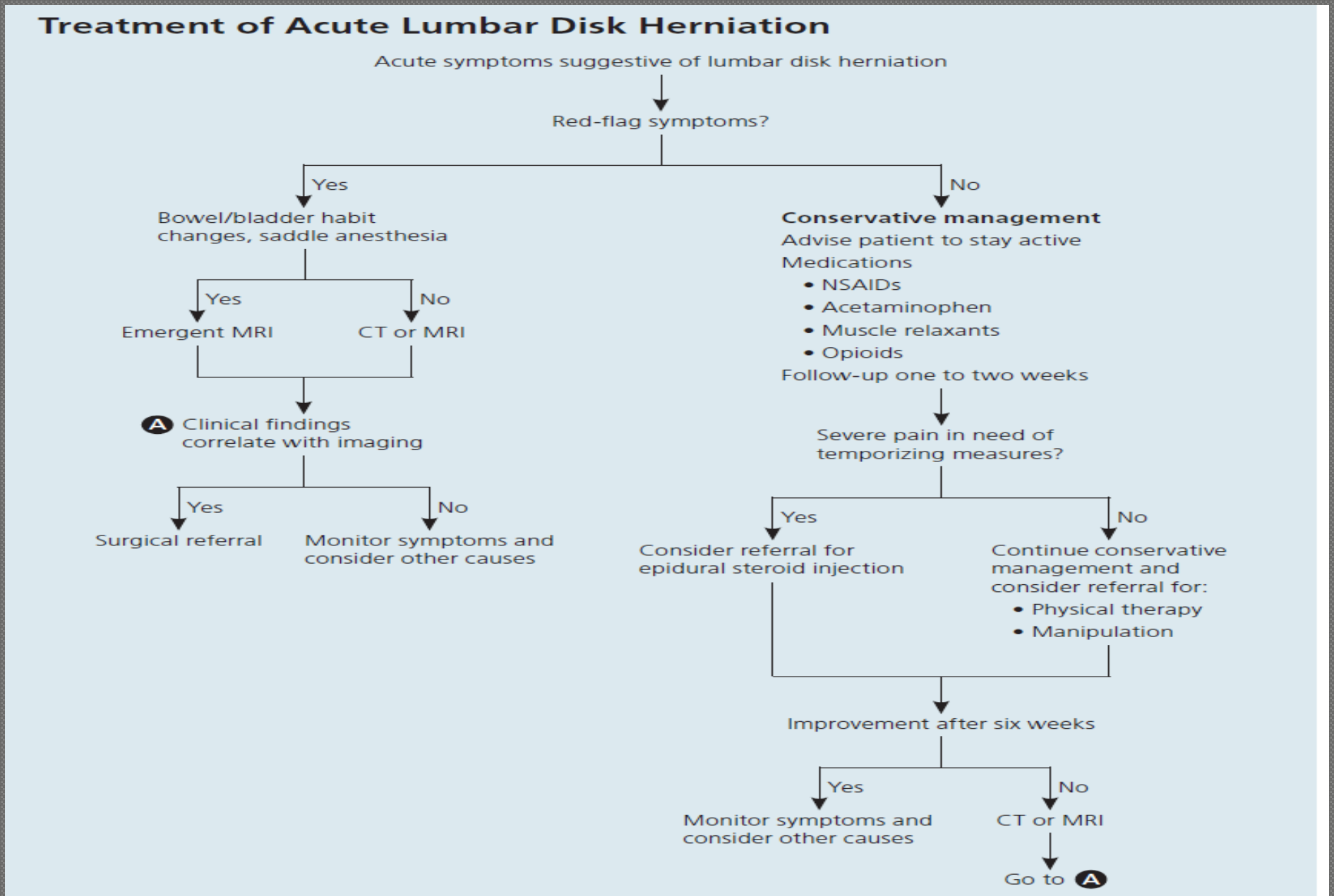


Figure 2. Algorithm for treatment of acute lumbar disk herniation. (CT = computed tomography; MRI = magnetic resonance imaging; NSAIDs = nonsteroidal anti-inflammatory drugs.)

Phase	Emphasis	Recommended Exercises	Guidelines
Phase 1 Acute Phase	• Control pain and Inflammation • Reduce muscle spasm • Establish pain free positions and postures for sitting, sleeping an standing • Stay active/walk	To be determined based upon individual assessment and will include gentle stretching, ROM and core muscle activation.	• Perform activities and exercise that minimize pain • Avoid activities and positions that worsen symptoms • Stay as active as possible
Phase 2 Sub-acute Phase	• Continue to avoid exacerbation of Symptoms • Progressive increase in activity level and distance walking • Begin improving spinal and LE flexibility • Begin lower extremity strengthening • Begin abdominal and pelvic stabilization exercises	**ROM and Flexibility** Lower extremity stretches Spinal stretches **Strength** Initiate core stabilization exercise progressions incorporate transverses abdominus and multifidi coordinated with hip musculature • Quadruped (bird dog) progression • Bridge progression • Side plank (gluteus medius) progression • Prone plank or hooklying abdominal progression Light hip and lower extremity strengthening **Function** Bending and squatting Walk daily	• Stay as active as possible • Perform strengthening and stabilization exercises 3 times a week, 2- sets of 15-20 reps • Stretching program daily 2-3 repetitions of 30 seconds • Begin functional movements
Phase 3 Rehabilitation Phase	• Continue to maximize return of strength and flexibility • Initiate functional activities	**Flexibilty** Continue spinal and lower extremity stretching **Cardio** Daily walking, jogging, swimming, elliptical or aerobic conditioning **Strengthening** Continue progressed stabilization exercises incorporating transverses abdominus and multifidi coordinated with hip musculature • Quadruped (bird dog) progression • Bridge progression • Side plank (gluteus medius) progression • Prone plank or hooklying abdominal progression • Use of exercise machines to strengthen spinal musculature Hip and lower extremity strengthening • Squat progression	• Perform functional lifting, bending and reaching • Stretching program daily 2-3 repetitions of 30 seconds • Cardio program should be performed no more that 3-5 times a week for 20-45 minutes • Perform strengthening exercises 3 times a week, 2-3 sets of 15-20 reps

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TERIMAKASIH