

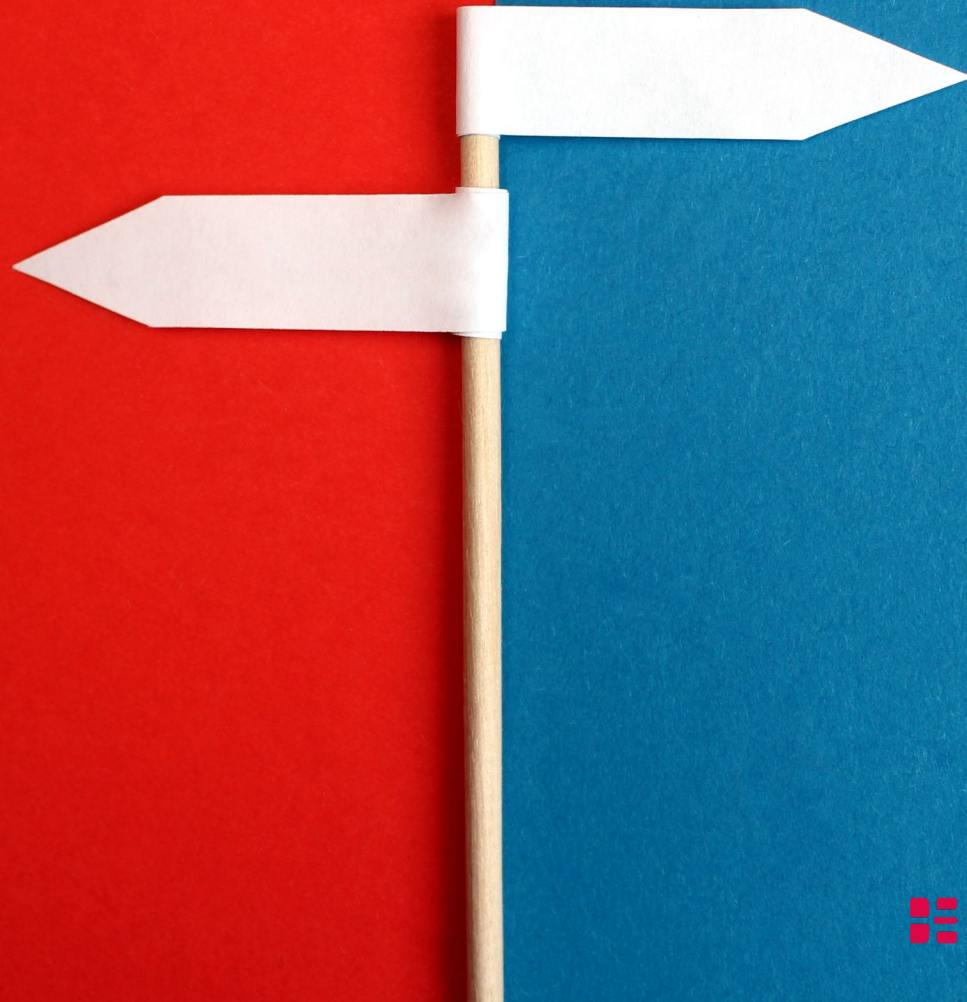
Cervical radiculopathy





Learning goals

1. Specific vs nonspecific neck pain
2. Anatomy & causes of radicular pain & radiculopathy
3. Prognosis & treatments
4. Guideline based care



Specific vs
nonspecific
neck pain



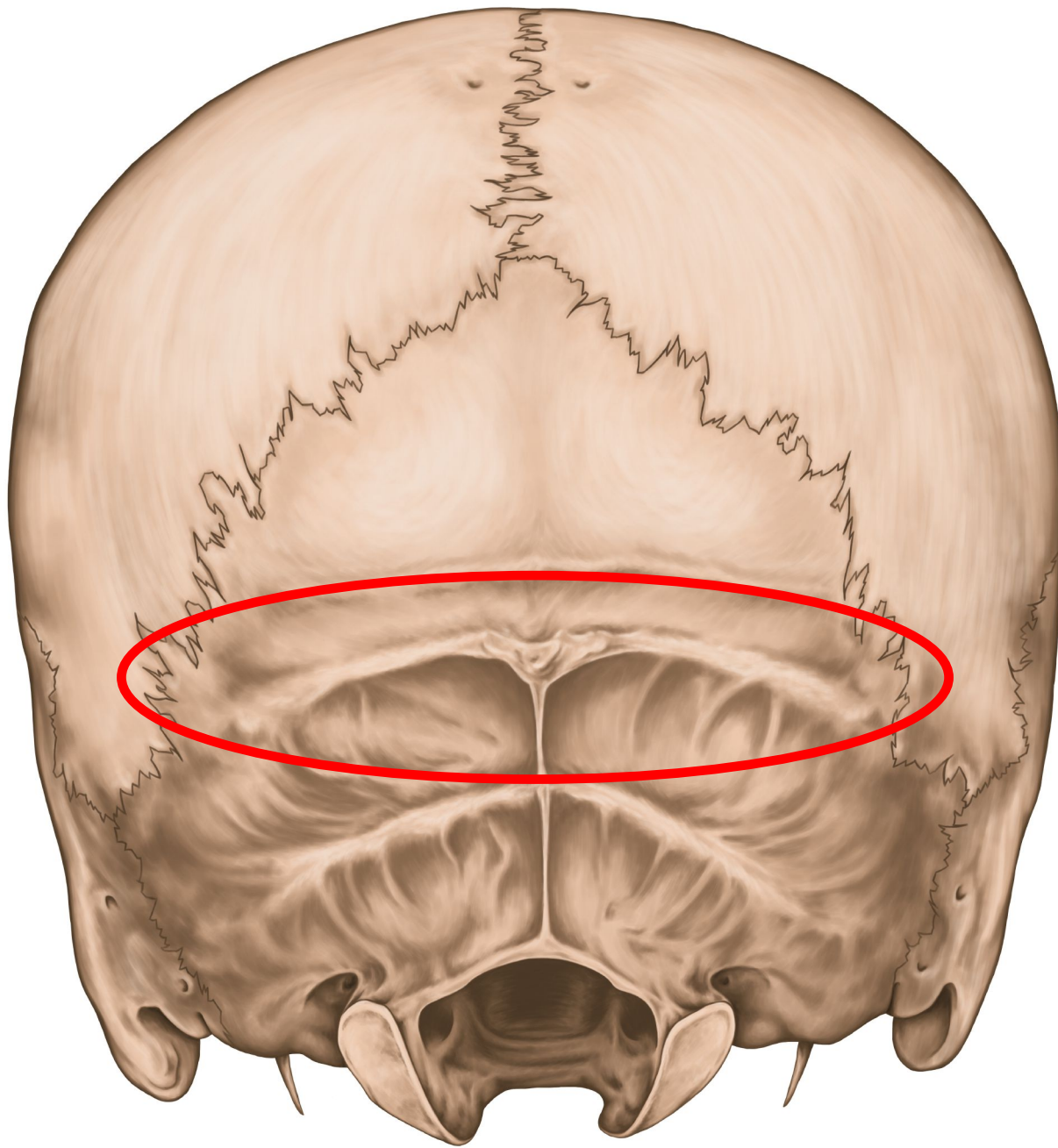
Definition of neck pain

“An unpleasant sensory & emotional experience associated with actual or potential tissue damage”

Between superior nuchal line & scapular spine

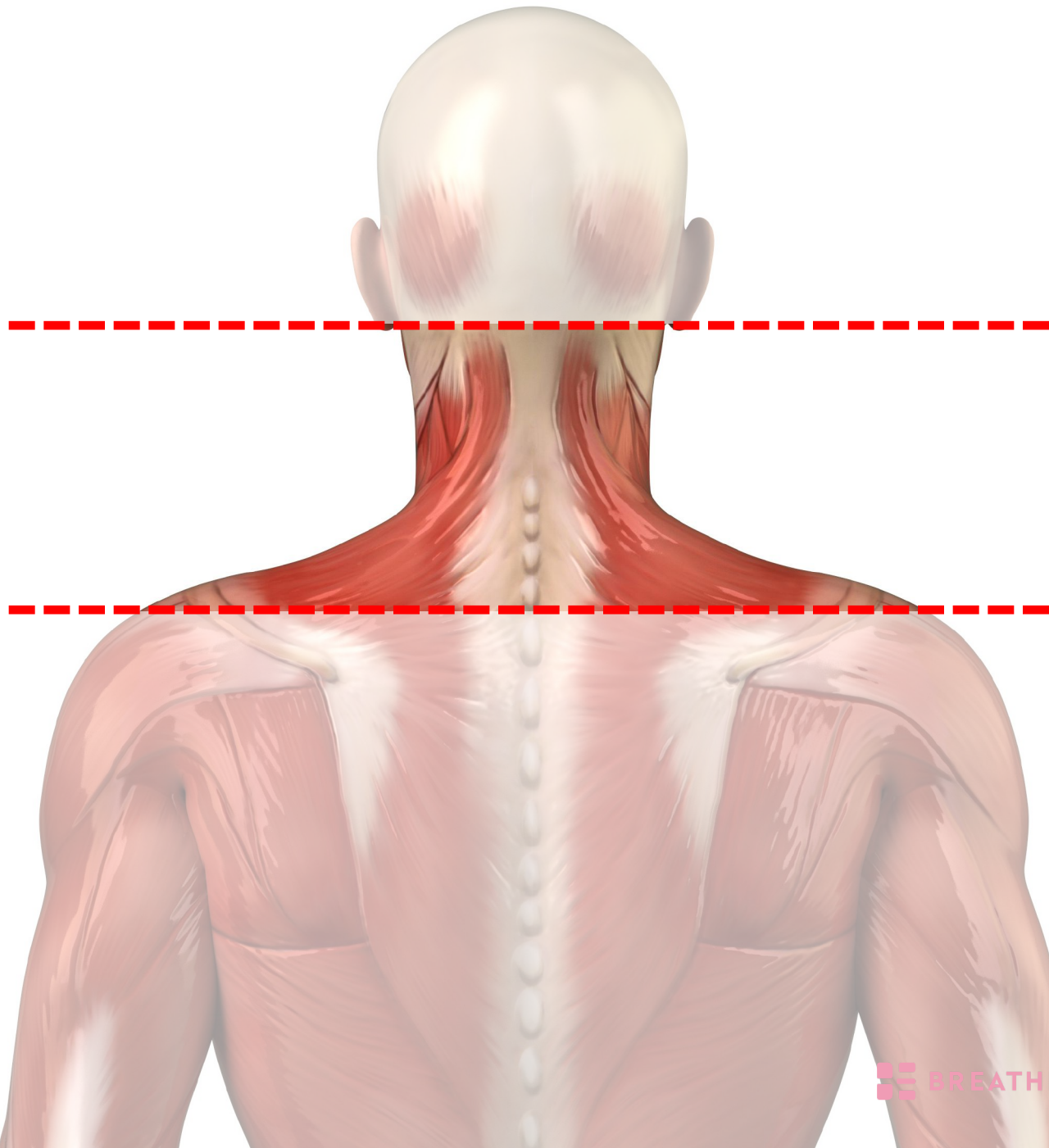
With or without radiculopathy

Bier, J. D., Scholten-Peeters, W. G. M., Staal, J. B., Pool, J., van Tulder, M. W., Beekman, E., . . . Verhagen, A. P. (2017). Clinical Practice Guideline for Physical Therapy Assessment and Treatment in Patients With Nonspecific Neck Pain. *Physical therapy*, 98(3), 162-171. doi:10.1093/ptj/pzx118. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%201%20Neck%20pathology/Bier-2017-Clinical%20Practice%20Guideline%20for%20Phys.pdf>



Superior nuchal line

Insertion of upper trapezius & sub
occipitals



Between the
superior nuchal
line & the
scapular spine



Specific neck pain

Neck pain related to:

- Fracture
- Vertebral artery dissection
- Spinal cord injury
- Spinal infection, ankylosing spondylitis
- Cancer
- Systemic diseases

Bier, J. D., Scholten-Peeters, W. G. M., Staal, J. B., Pool, J., van Tulder, M. W., Beekman, E., ... Verhagen, A. P. (2017). Clinical Practice Guideline for Physical Therapy Assessment and Treatment in Patients With Nonspecific Neck Pain. *Physical therapy*, 98(3), 162-171. doi:10.1093/ptj/pzx118 <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Bier-2017-Clinical%20Practice%20Guideline%20for%20Phys.pdf>



Nonspecific neck pain (NSNP)

Neck pain **not** related to cancer, fracture, vertebral artery dissection, spinal cord injury, cancer or systemic disease.

With or without arm pain

With or without disc bulge, stenosis, disc degeneration

Bier, J. D., Scholten-Peeters, W. G. M., Staal, J. B., Pool, J., van Tulder, M. W., Beekman, E., . . . Verhagen, A. P. (2017). Clinical Practice Guideline for Physical Therapy Assessment and Treatment in Patients With Nonspecific Neck Pain. *Physical therapy*, 98(3), 162-171. doi:10.1093/ptj/pzx118 <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Bier-2017-Clinical%20Practice%20Guideline%20for%20Phys.pdf>

Pathology	Corresponding Red Flags
Fracture	Age>70, history of trauma, corticosteroid use, osteoporosis
Vertebral artery dissection	Cerebrovascular (stroke) symptoms or signs
Spinal cord injury	Widespread neurologic signs in both arms or in the legs such as sensory deficits, loss of muscle function or bladder/bowel dysfunction
Infection	Symptoms & signs of infection e.g. fever, night sweats. Risk factors for infection e.g. immune suppression, penetrating wound, underlying disease process, IV drug use, exposure to infectious disease
Cancer	History of cancer, failure to improve with 1 month of treatment, unexplained weight loss, age >50, vomiting, headache
Systemic disease e.g. herpes, ankylosis spondylitis	Headache, fever, unilateral skin rash, burning pain, itching

Bier, J. D., Scholten-Peeters, W. G. M., Staal, J. B., Pool, J., van Tulder, M. W., Beekman, E., . . . Verhagen, A. P. (2017). Clinical Practice Guideline for Physical Therapy Assessment and Treatment in Patients With Nonspecific Neck Pain. *Physical therapy*, 98(3), 162-171. doi:10.1093/ptj/pzx118 <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Bier-2017-Clinical%20Practice%20Guideline%20for%20Phys.pdf>



Self-test

- What is neck pain?
- What is specific neck pain?
- List up to 6 specific causes of neck pain
- What is nonspecific neck pain?
- List up to 3 diagnoses associated with nonspecific neck pain



Anatomy & causes of

Radicular pain & radiculopathy

Radix = root

Opathy = disorder (from *pathos*)

Radicular pain = pain in the arm caused by irritation of the cervical nerve root

Radiculopathy = umbrella term meaning a problem with the nerve root causes pain, sensory loss or motor loss



Arm pain results from a complex interaction of inflammation & compression

Kelly, J. C., Groarke, P. J., Butler, J. S., Poynton, A. R., & O'Byrne, J. M. (2012). The natural history and clinical syndromes of degenerative cervical spondylosis. *Advances in orthopedics*, 2012. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Kelly-2012-The%20natural%20history%20and%20clinical%20sy.pdf>



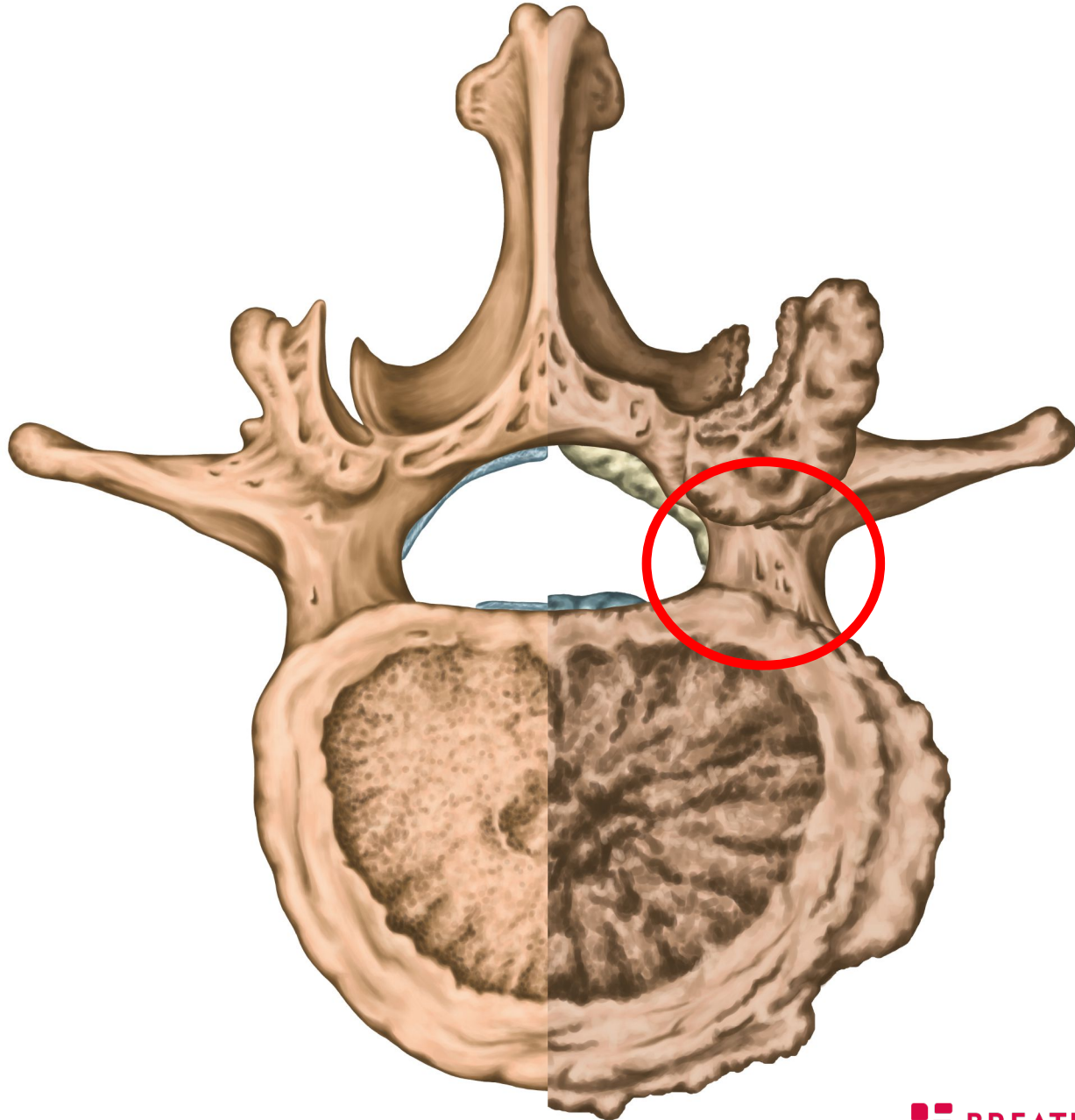
BREATHE EDUCATION



It can be caused
by a combination
of

- Disc degeneration
- Disc bulge
- Canal or foraminal stenosis
- Inflammation

Kelly, J. C., Groarke, P. J., Butler, J. S., Poynton, A. R., & O'Byrne, J. M. (2012). The natural history and clinical syndromes of degenerative cervical spondylosis. *Advances in orthopedics*, 2012. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Kelly-2012-The%20natural%20history%20and%20clinical%20sy.pdf>



Stenosis
increases risk of
arm pain **5x**

Okada, E, Daimon, K, Fujiwara, H, Nishiwaki, Y, Nojiri, K, Watanabe, M, . . .
Fujita, N. (2018). Twenty-year Longitudinal Follow-up MRI Study of
Asymptomatic Volunteers. Clinical spine surgery, 31(10), 446-
451. [https://be-research-
papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/L
ecture%2021%20Neck%20pathology/Daimon-2018-A%2020-
Year%20Prospective%20Longitudinal.pdf](https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Daimon-2018-A%2020-Year%20Prospective%20Longitudinal.pdf)

Arm pain worse than neck pain

Aggravated by ironing

Alleviated walking with hand in pocket

Positive Spurling test

Reduced reflexes

Signs of radicular pain

More signs = more likelihood arm pain is “from” the neck

Sleijser-Koehorst, M. L., Coppieters, M. W., Epping, R., Rooker, S., Verhagen, A. P., & Scholten-Peeters, G. G. (2021). Diagnostic accuracy of patient interview items and clinical tests for cervical radiculopathy. *Physiotherapy*, 111, 74-82. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Sleijser-Koehor-2021-Diagnostic%20accuracy%20of%20pa.pdf>



Spurling's Test



Assessment



Self-test

- What is radicular pain?
- What is radiculopathy?
- What can contribute to radicular pain?
- How does stenosis affect risk of radicular pain?
- List 5 signs of radicular pain
- Describe the Spurling test
- Is radicular pain specific or nonspecific?



Prognosis & treatments



Prognosis & treatments

- Favorable prognosis
- Address psychosocial factors as they are the biggest predictors of outcomes for NSNP
- Most forms of exercise help NSNP
- A little bit of exercise helps, more is not better



The majority of
NSNP improves
a lot over 3–6
months

Vasseljen, O., Woodhouse, A., Bjørngaard, J. H., & Leivseth, L. (2013). Natural course of acute neck and low back pain in the general population: the HUNT study. PAIN®, 154(8), 1237–1244. [https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Vasseljen-2013-Natural%20course%20of%20acute%20neck%20an.pdf](https://papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Vasseljen-2013-Natural%20course%20of%20acute%20neck%20an.pdf)



83% of people
with cervical
radiculopathy
are pain-free
within 36 months

Wong, J. J., Côté, P., Quesnele, J. J., Stern, P. J., & Mior, S. A. (2014). The course and prognostic factors of symptomatic cervical disc herniation with radiculopathy: a systematic review of the literature. The Spine Journal, 14(8), 1781-1789. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Wong-2014-The%20course%20and%20prognostic%20factors%20of.pdf>



Poor sleep quality & quantity increase risk of neck pain **4x**

Auvinen, J. P., Tammelin, T. H., Taimela, S. P., Zitting, P. J., Järvelin, M.-R., Taanila, A. M., & Karppinen, J. I. (2010). Is insufficient quantity and quality of sleep a risk factor for neck, shoulder and low back pain? A longitudinal study among adolescents. *European Spine Journal*, 19(4), 641-649. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Auvinen-2010-Is%20insufficient%20quantity%20and%20qual.pdf>



Depressive
symptoms also
increase risk of
neck pain **4x**

Carroll, L. J., Cassidy, J. D., & Côté, P. (2004). Depression as a risk factor for onset of an episode of troublesome neck and low back pain. PAIN, 107(1-2), 134-139. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Carroll-2004-Depression%20as%20a%20risk%20factor%20for%20o.pdf>



Other prognostic factors

- Severe activity limitation
- High pain intensity
- Poor coping ability
- Negative expectation
- Fear-avoidance

Mansell, G., Corp, N., Wynne-Jones, G., Hill, J., Stynes, S., & van der Windt, D. (2021). Self-reported prognostic factors in adults reporting neck or low back pain: An umbrella review. Eur J Pain. doi:10.1002/ejp.1782 <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Mansell%202021.pdf>



Treatments that don't work for neck pain

- Education alone
- Dry needling
- Ergonomic interventions
- Stretching & ROM interventions



Education alone is not effective for neck pain

Ainpradub, K., Sitthipornvorakul, E., Janwantanakul, P., & van der Beek, A. J. (2016). Effect of education on non-specific neck and low back pain: a meta-analysis of randomized controlled trials. *Manual Therapy*, 22, 31-41. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%201%20Neck%20pathology/Ainpradub-2016-Effect%20of%20education%20on%20non-spec.pdf>

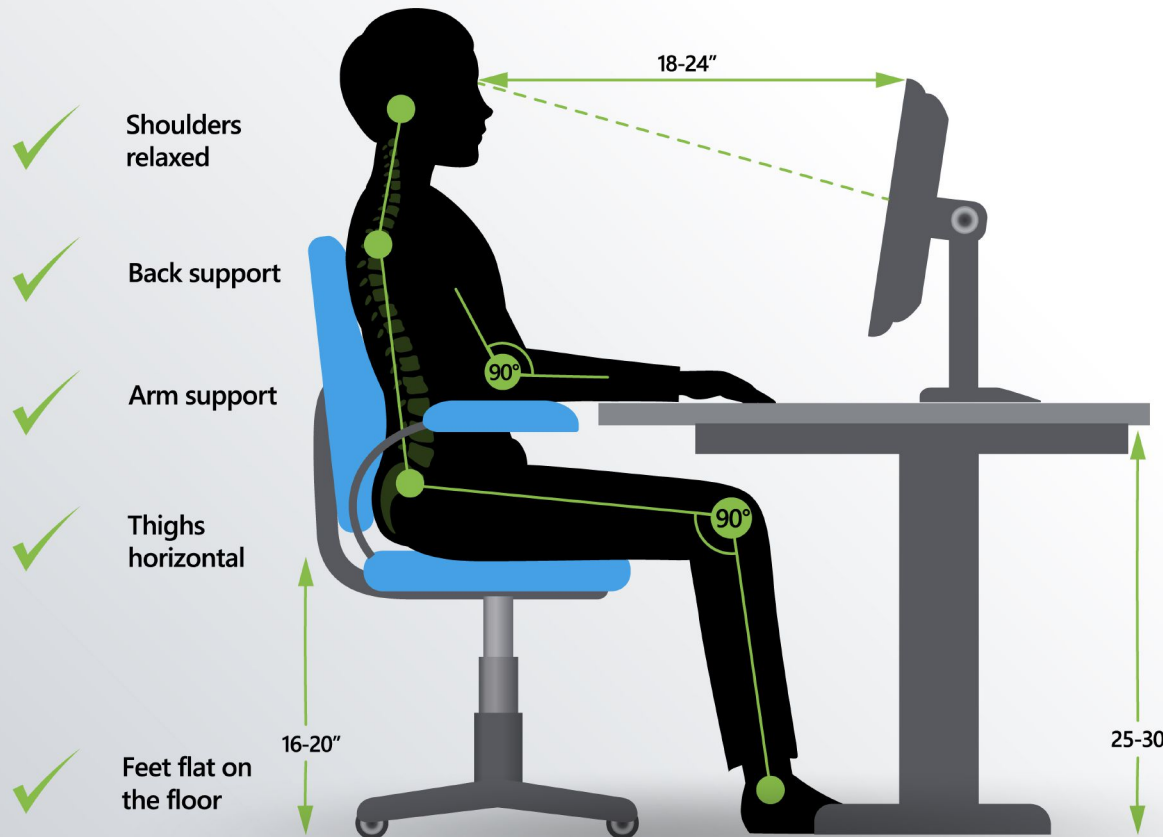


Dry needling & sham dry needling give the same results

Aka = dry needling IS a sham

Gattie, E., Cleland, J. A., Pandya, J., & Snodgrass, S. (2021). Dry Needling Adds No Benefit to the Treatment of Neck Pain: A Sham-Controlled Randomized Clinical Trial With 1-Year Follow-up. *Journal of Orthopaedic & Sports Physical Therapy*, 51(1), 37-45. Retrieved from <https://www.jospt.org/doi/pdf/10.2519/jospt.2021.9864>

CORRECT SITTING POSTURE



Ergonomic
interventions
have very weak
evidence

Chen, X., Coombes, B. K., Sjøgaard, G., Jun, D., O'leary, S., & Johnston, V. (2017). Workplace-Based Interventions for Neck Pain in Office Workers: Systematic Review and Meta-Analysis. *Physical therapy*, 98(1), 40-62. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%201%20Neck%20pathology/Chen-2017-Workplace-Based%20Interventions%20for%20Ne.PDF>



Effective treatments for neck pain

- Address psychosocial factors
- Just about any form of exercise
- Combine exercise with manual therapy for even better results



Exercise is great but doing more doesn't add more benefit

Wilhelm, M. P., Donaldson, M., Griswold, D., Learman, K. E., Garcia, A. N., Learman, S. M., & Cleland, J. A. (2020). The Effects of Exercise Dosage on Neck-Related Pain and Disability: A Systematic Review With Meta-analysis. *Journal of Orthopaedic & Sports Physical Therapy*, 50(11), 607–621. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Wilhelm-2020-The%20Effects%20of%20Exercise%20Dosage%20on.pdf>

Conclusion There is not one superior type of physical exercise for people with chronic non-specific neck pain. Rather, there is very low quality evidence that motor control, yoga/Pilates/Tai Chi/Qigong and strengthening exercises are equally effective. These findings may assist clinicians to select exercises for people with chronic non-specific neck pain.

De Zoete, R. M., Armfield, N. R., McAuley, J. H., Chen, K., & Sterling, M. (2021). Comparative effectiveness of physical exercise interventions for chronic non-specific neck pain: a systematic review with network meta-analysis of 40 randomised controlled trials. *British Journal of Sports Medicine*, 55(13), 730-742. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/De%20Zoete-2021-Comparative%20effectiveness%20of%20phy.pdf>



Neck strengthening reduces future neck pain by 55%

Sihawong, R., Janwantanakul, P., & Jiamjarasrangsri, W. (2013). Effects of an exercise programme on preventing neck pain among office workers: a 12-month cluster-randomised controlled trial. *Occup Environ Med*, oemed-2013-101561. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%201%20Neck%20pathology/Sihawong-2013-Effects%20of%20an%20exercise%20programme.pdf>

$$1 + 1 = 3$$

Exercise plus
manual therapy
is better than
either alone

Hidalgo, B., Hall, T., Bossert, J., Dugeny, A., Cagnie, B., & Pitance, L. (2017). The efficacy of manual therapy and exercise for treating non-specific neck pain: A systematic review. Journal of back and musculoskeletal rehabilitation, 30(6), 1149-1169. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%201%20Neck%20pathology/Hidalgo-2017-The%20efficacy%20of%20manual%20therapy%20an.pdf>



Manual therapy
works equally well
at the painful joint
or any other joint

Hidalgo, B., Hall, T., Bossert, J., Dugeny, A., Cagnie, B., & Pitance, L. (2017). The efficacy of manual therapy and exercise for treating non-specific neck pain: A systematic review. *Journal of back and musculoskeletal rehabilitation*, 30(6), 1149-1169. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Hidalgo-2017-The%20efficacy%20of%20manual%20therapy%20an.pdf>



Self-test

- What is the natural history of radicular pain?
- True/False: Dry needling is effective for neck pain
- List 3 psychosocial factors that contribute to neck pain
- True/False combining exercise with manual therapy is more effective than either alone
- What kind of exercise is most effective for neck pain **with or without** radiculopathy?



There are 2 types
of people in the
world...



There are 2 types
of people in the
world...



There are 2 types
of people in the
world...

Neck pain **with**
Red Flags

Neck pain
without Red
Flags

There are 2 types
of neck pain in
the world...

Neck pain **with**
Red Flags

Refer for medical attention

Neck pain
without Red
Flags

Give Pilates



Red Flags

Signs that a person's pain may be caused by a serious* underlying medical condition

*Medically serious = life threatening

Pathology	Corresponding Red Flags
Fracture	2 or more of: Age>70, history of trauma, corticosteroid use, osteoporosis
Vertebral artery dissection	Cerebrovascular (stroke) symptoms or signs
Spinal cord injury	Widespread neurologic signs in both arms or in the legs such as sensory deficits, loss of muscle function or bladder/bowel dysfunction
Infection	Symptoms & signs of infection e.g. fever, night sweats. Risk factors for infection e.g. immune suppression, penetrating wound, underlying disease process, IV drug use, exposure to infectious disease
Cancer	History of cancer, failure to improve with 1 month of treatment, unexplained weight loss, age >50, vomiting, headache
Systemic disease e.g. herpes, ankylosis spondylitis	Headache, fever, unilateral skin rash, burning pain, itching

To screen for	Fracture
Ask these questions	<ul style="list-style-type: none"> • Is your age >70? • Did your pain start after a big bump or other trauma? • Do you regularly use corticosteroids? • Have you been diagnosed with osteoporosis?
Interpret results	<ul style="list-style-type: none"> • If they say yes to any 2 or more, refer to emergency room • If they say yes to 1 or none, rule out spinal fracture

Pathology	Red Flags	Refer to
Fracture	2 or more of: Age>70, history of trauma, corticosteroid use, osteoporosis	Emergency room
Vertebral artery dissection	Cerebrovascular (stroke) symptoms or signs	Emergency room
Spinal cord injury	Widespread neurologic signs in both arms or in the legs such as sensory deficits, loss of muscle function or bladder/bowel dysfunction	Emergency room
Infection	Symptoms & signs of infection e.g. fever, night sweats. Risk factors for infection e.g. immune suppression, penetrating wound, underlying disease process, IV drug use, exposure to infectious disease	Medical doctor
Cancer	History of cancer, failure to improve with 1 month of treatment, unexplained weight loss, age >50, vomiting, headache	Medical doctor
Systemic disease e.g. herpes, ankylosis spondylitis	Headache, fever, unilateral skin rash, burning pain, itching	Medical doctor



Self-test

- How many types of people are there in the world?
- Dog or cat?
- Coffee or tea?
- What does “Red Flags” mean?
- What are the Red Flag pathologies for neck pain?

A yellow book with the words "How To" in large, bold, black letters is lying on a light-colored wooden surface. The book is slightly angled, showing its thickness and the edges of its pages. The wood grain of the surface is visible, running diagonally across the frame.

**How
To**

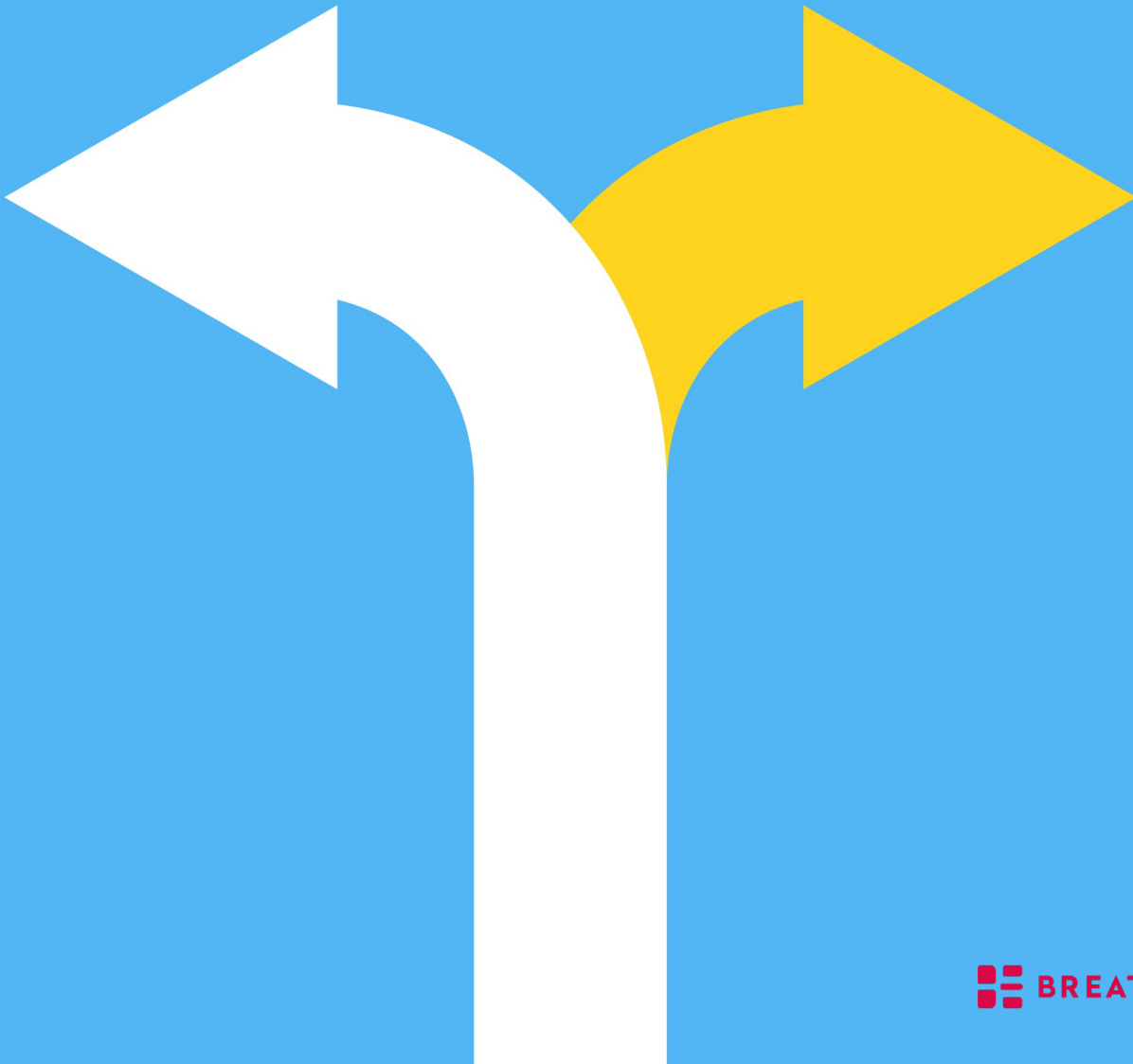
Guideline based
care



Stratify

Stratum = layer

Stratify = divide into layers



Stratified care

Different care for people with different risk profiles

e.g., less intensive care for low-risk people and more intensive care for high-risk people



Stratified care leads to better outcomes & lower costs

Sowden, G., Hill, J. C., Morso, L., Louw, Q., & Foster, N. E. (2018). Advancing practice for back pain through stratified care (STarT Back). *Brazilian Journal of Physical Therapy*, 22(4), 255-264. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2022%20Neck%20guidelines/Sowden-2018-Advancing%20practice%20for%20back%20pain%20t.pdf>

Neck pain **with**
Red Flags

Neck pain
without Red
Flags

There are 2 types
of neck pain in
the world...

Neck pain
without Red
Flags

Nonspecific neck
pain



There are 2 types
of nonspecific
neck pain in the
world...

Low risk of chronicity

Profile

First 6 weeks AND
No dominant psychosocial profile

High risk of chronicity

Profile

Not recovered after 6 weeks AND/OR
Dominant psychosocial profile



What does
**dominant
psychosocial
profile** mean?



Dominant psychosocial profile

1 or more of the following are impacting the client significantly

- Poor sleep
- Stress /anxiety / depression
- Negative pain beliefs
- Expectation of poor outcome
- Poor coping ability
- Fear avoidance



Self-test

- What is stratified care?
- What are the benefits of stratified care?
- What is the benefit of providing care based on prognosis rather than diagnosis?
- What is the low risk profile?
- High risk?
- What is *dominant psychosocial profile*?

Low risk of chronicity

Profile

First 6 weeks AND
No dominant psychosocial profile

Guideline*

- Explain prognosis
- Give home exercises
- Max 3 sessions

High risk of chronicity

Profile

Not recovered after 6 weeks AND/OR
Dominant psychosocial profile

Guideline*

- Explain prognosis
- Address psychosocial factors
- Exercise + manual therapy

*If radiculopathy; optional short-term soft collar to relieve symptoms & consult medical doctor

Hidalgo, B., Hall, T., Bossert, J., Dugeny, A., Cagnie, B., & Pitance, L. (2017). The efficacy of manual therapy and exercise for treating non-specific neck pain: A systematic review. Journal of back and musculoskeletal rehabilitation, 30(6), 1149-1169. <https://be-research-papers.s3.amazonaws.com/Diploma%20lecture%20research%20papers/Lecture%2021%20Neck%20pathology/Hidalgo-2017-The%20efficacy%20of%20manual%20therapy%20an.pdf>



Signs you should refer to a mental health professional

- Diagnosed mental illness
- You feel out of your depth

*Mental health professional = registered psychologist who does CBT or ACT



Self-test

- What is guideline care for people with neck pain at low risk of chronicity?
- High risk?
- Give an example of how you could address a psychosocial factor
- Give an example of when you would refer to a mental health professional & who you would refer to
- What extra measures for people with radiculopathy?



Learning goals

1. Specific vs nonspecific neck pain
2. Anatomy & causes of radicular pain & radiculopathy
3. Prognosis & treatment
4. Guideline based care

Questions?

