



RugNetwerk Twente



Voor het optimaliseren van
fysiotherapeutisch handelen
bij LRP patiënten in Twente.

WELKOM.

Eerste bijeenkomst RNT, 13-12-2012, Saxion hogeschool Enschede.



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Cervicale Radiculopathie en Myelopathie, FT perspectief.

Door Gerard Koel, FT / MT / MSc / Docent Saxion

Presentatie 1, 13-12-2012, Saxion hogeschool Enschede.



INHOUD



1. Inleiding.
2. Diagnostiek Cervicale Radiculopathie (CR);
huiswerk artikel Robert Wainner et al.
3. Diagnostiek Cervicale Myelopathie (CM).
4. Klinische relevantie van de diagnostiek.
5. Behandeling van de CR
 - Fysiotherapie (huiswerk: studie Cleland et al
 - Chirurgie (ACDF)
6. Afsluiting, adviezen, conclusies.



Nekpijn / armpijn, hoe lastig is dat?



1. INLEIDING



- Nek-armpijn kent een hoge prevalentie.
- Er zijn verschillende lokaal pathologisch – anatomische stoornissen die een verklaring kunnen zijn voor de nek – arm pijn.
- Naast biologische / somatische oorzaken, is ook sprake v. psychosociale aspecten (BPS).
- Bij CR & CM focussen we op de structurele neurologische stoornissen.
- Samenwerking chirurg / FT is belangrijk.

Definities, beschrijvingen.

- CR: een stoornis van de cervicale spinale zenuw, meestal op basis van een discus hernia (CDD: Cervical Disc Disease).
Signs afh. van inflammatie en conductie.
- CM: een stoornis van het cervicale ruggenmerg, meestal op basis van spondylose, nauw wervelkanaal, trauma.
Signs: uitgebreid klachtenbeeld.
- CMR: Cervicale MyeloRadiculopathie;
armpijn met lange baan verschijnselen.
- GS: MRI en elektrofysiologisch onderzoek.



2. DIAGNOSTIEK CR.



- Diagnostische studie Robert Wainner et al.
- Populatie: patienten worden verwezen voor elektrofysiologisch onderzoek op verdenking van CR en / of CTS.
- N=82: - geen CR of CTS: 40 (48%)
- CTS (uni of bi): 23 (28%)
- CR (soms met CTS): 19 (23%)
- Welke klinische tests zijn, welk test cluster is, in staat CR correct te diagnostiseren?

Vraag 1:
Wat zijn tests met een goede reliability?

Variable	Kappa 95 CI	ICC 95 CI	SEM (°)
Question 1—"Most bothersome symptoms..."	0.74 (0.55–0.93)		
Question 2—"Where most bothersome..."	0.82 (0.68–0.96)		
Question 3—"Symptom behavior..."	0.57 (0.35–0.79)		
Question 4—"Entire limb numb..."	0.53 (0.26–0.81)		
Question 5—"Symptoms keep from sleep..."	0.70 (0.48–0.92)		
Question 6—"Neck movement improves..."	0.67 (0.44–0.90)		
C5 Dermatome	0.67 (0.33–1.0)		
C6 Dermatome	0.28 (0.00–0.58)		
C7 Dermatome	0.40 (0.06–0.74)		
C8 Dermatome	0.16 (0.00–0.50)		
T1 Dermatome	0.46 (0.04–0.88)		
MMT deltoid	0.62 (0.28–0.96)		
MMT biceps brachii	0.69 (0.36–1.0)		
MMT extensor carpi radialis longus/brevis	0.63 (0.26–1.0)		
MMT triceps brachii	0.29 (0.00–0.79)		
MMT flexor carpi radialis	0.23 (0.00–0.69)		
MMT abductor pollicis	0.39 (0.00–0.80)		
MMT first dorsal interosseus	0.37 (0.00–0.80)		
Biceps brachii MSR	0.73 (0.38–1.0)		
Spurling's A	0.60 (0.32–0.87)	—	—
Spurling's B	0.62 (0.25–0.99)	—	—
Shoulder abduction	0.20 (0.00–0.59)	—	—
Valsalva	0.69 (0.36–1.0)	—	—
Distraction	0.88 (0.64–1.0)	—	—
ULTT A	0.76 (0.51–1.0)	—	—
ULTT B	0.83 (0.65–1.0)	—	—
Cervical flexion	—	0.79 (0.65–0.88)	4.6
Cervical extension	—	0.84 (0.70–0.95)	4.8
Cervical left rotation	—	0.75 (0.59–0.85)	6.6
Cervical right rotation	—	0.63 (0.22–0.82)	7.3
Cervical left sidebending	—	0.63 (0.40–0.78)	5.3
Cervical right sidebending	—	0.68 (0.62–0.87)	5.4

ICC = intraclass correlation coefficient; SEM = standard error of the mean; 95 CI = 95% confidence intervals.
Reliability of tricep brachii and brachioradialis not assessed because of low prevalence.

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Valsalva	0.69 (0.36–1.0)		—
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Cervical right rotation	—	0.63 (0.22–0.82)	7.3
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ICC = intraclass correlation coefficient; SEM = standard error of the mean; 95 CI = 95% confidence intervals.
Reliability of tricep brachii and brachioradialis not assessed because of low prevalence.

6 tests:
3: 'goed'

26 tests:
15: 'goed'

Vraag 2: De 10 tests met de beste validiteit?

Table 4. Validity of Conventional Neurologic Examination Items, Provocative Tests, and Cervical ROM

Variable	Sn 95 CI	Sp 95 CI	LR- 95 CI	LR+ 95 CI
C5 Dermatome	0.29 (0.08–0.51)	0.86 (0.77–0.94)	0.82 (0.60–1.1)	2.1 (0.79–5.3)
C6 Dermatome	0.24 (0.03–0.44)	0.66 (0.54–0.78)	1.16 (0.84–1.6)	0.69 (0.28–1.8)
C7 Dermatome	0.18 (0.0–0.36)	0.77 (0.66–0.87)	1.07 (0.83–1.4)	0.76 (0.25–2.3)
C8 Dermatome	0.12 (0.0–0.27)	0.81 (0.71–0.90)	1.09 (0.88–1.4)	0.61 (0.15–2.5)
T1 Dermatome	0.18 (0.0–0.36)	0.79 (0.68–0.89)	1.05 (0.81–1.4)	0.83 (0.27–2.6)
MMT deltoid	0.24 (0.03–0.44)	0.89 (0.81–0.97)	0.86 (0.65–1.1)	2.1 (0.70–6.4)
MMT biceps brachii	0.24 (0.03–0.44)	0.94 (0.88–1.0)	0.82 (0.62–1.1)	3.7 (1.0–13.3)
MMT extensor carpi radialis longus/brevis	0.12 (0.0–0.27)	0.90 (0.83–0.98)	0.98 (0.81–1.2)	1.2 (0.27–5.6)
MMT triceps brachii	0.12 (0.0–0.27)	0.94 (0.88–1.0)	0.94 (0.78–1.1)	1.9 (0.37–9.3)
MMT flexor carpi radialis	0.06 (0.0–0.17)	0.89 (0.82–0.97)	1.05 (0.91–1.2)	0.55 (0.07–4.2)
MMT abductor pollicis brevis	0.06 (0.0–0.17)	0.84 (0.75–0.93)	1.12 (0.95–1.3)	0.37 (0.05–2.7)
MMT first dorsal interosseus	0.03 (0.0–0.10)	0.93 (0.87–0.99)	1.05 (0.94–1.2)	0.40 (0.02–7.0)
Biceps brachii MSR	0.24 (0.3–0.44)	0.95 (0.90–1.0)	0.80 (0.61–1.1)	4.9 (1.2–20.0)
Brachioradialis MSR	0.06 (0.0–0.17)	0.95 (0.90–1.0)	0.99 (0.87–1.1)	1.2 (0.14–11.1)
Triceps MSR	0.03 (0.0–0.10)	0.93 (0.87–0.99)	1.05 (0.94–1.2)	0.40 (0.02–7.0)
Spurling's A	0.50 (0.27–0.73)	0.86 (0.77–0.94)	0.58 (0.36–0.94)	3.5 (1.6–7.5)
Spurling's B	0.50 (0.27–0.73)	0.74 (0.63–0.85)	0.67 (0.42–1.1)	1.9 (1.0–3.6)
Shoulder abduction	0.17 (0.0–0.34)	0.92 (0.85–0.99)	0.91 (0.73–1.1)	2.1 (0.55–8.0)
Valsalva	0.22 (0.03–0.41)	0.94 (0.88–1.0)	0.83 (0.64–1.1)	3.5 (0.97–12.6)
Distraction	0.44 (0.21–0.67)	0.90 (0.82–0.98)	0.62 (0.40–0.90)	4.4 (1.8–11.1)
Upper limb tension test A	0.97 (0.90–1.0)	0.22 (0.12–0.33)	0.12 (0.01–1.9)	1.3 (1.1–1.5)
Upper limb tension test B	0.72 (0.52–0.93)	0.33 (0.21–0.45)	0.85 (0.37–1.9)	1.1 (0.77–1.5)
Cervical flexion (<55°)	0.89 (0.74–1.0)	0.41 (0.29–0.53)	0.27 (0.07–1.0)	1.5 (1.2–2.0)
Involved rotation (<60°)	0.89 (0.74–1.0)	0.49 (0.37–0.62)	0.23 (0.06–0.85)	1.8 (1.3–2.4)

Sensitivity = Sn; specificity = Sp; negative likelihood ratios = LR-; positive likelihood ratios = LR+; 95 CI = 95% confidence intervals.

Variable	Sn 95 CI	Sp 95 CI	LR- 95 CI	LR+ 95 CI
C5 Dermatome	0.29 (0.08–0.51)	0.86 (0.77–0.94)	0.82 (0.60–1.1)	2.1 (0.79–5.3)
C6 Dermatome	0.24 (0.03–0.44)	0.66 (0.54–0.78)	1.16 (0.84–1.6)	0.69 (0.28–1.8)
C7 Dermatome	0.18 (0.0–0.36)	0.77 (0.66–0.87)	1.07 (0.83–1.4)	0.76 (0.25–2.3)
C8 Dermatome	0.12 (0.0–0.27)	0.81 (0.71–0.90)	1.09 (0.88–1.4)	0.61 (0.15–2.5)
T1 Dermatome	0.18 (0.0–0.36)	0.79 (0.68–0.89)	1.05 (0.81–1.4)	0.83 (0.27–2.6)
MMT deltoid	0.24 (0.03–0.44)	0.89 (0.81–0.97)	0.86 (0.65–1.1)	2.1 (0.70–6.4)
MMT biceps brachii	0.24 (0.03–0.44)	0.94 (0.88–1.0)	0.82 (0.62–1.1)	3.7 (1.0–13.3)
MMT extensor carpi radialis longus/brevis	0.12 (0.0–0.27)	0.90 (0.83–0.98)	0.98 (0.81–1.2)	1.2 (0.27–5.6)
MMT triceps brachii	0.12 (0.0–0.27)	0.94 (0.88–1.0)	0.94 (0.78–1.1)	1.9 (0.37–9.3)
MMT flexor carpi radialis	0.06 (0.0–0.17)	0.89 (0.82–0.97)	1.05 (0.91–1.2)	0.55 (0.07–4.2)
MMT abductor pollicis brevis	0.06 (0.0–0.17)	0.84 (0.75–0.93)	1.12 (0.95–1.3)	0.37 (0.05–2.7)
MMT first dorsal interosseus	0.03 (0.0–0.10)	0.93 (0.87–0.99)	1.05 (0.94–1.2)	0.40 (0.02–7.6)
Biceps brachii MSR	0.24 (0.3–0.44)	0.95 (0.90–1.0)	0.80 (0.61–1.1)	4.9 (1.2–20.0)
Brachioradialis MSR	0.06 (0.0–0.17)	0.95 (0.90–1.0)	0.99 (0.87–1.1)	1.2 (0.14–11.1)
Triceps MSR	0.03 (0.0–0.10)	0.93 (0.87–0.99)	1.05 (0.94–1.2)	0.40 (0.02–7.0)
Spurling's A	0.50 (0.27–0.73)	0.86 (0.77–0.94)	0.58 (0.36–0.94)	3.5 (1.6–7.5)
Spurling's B	0.50 (0.27–0.73)	0.74 (0.63–0.85)	0.67 (0.42–1.1)	1.9 (1.0–3.6)
Shoulder abduction	0.17 (0.0–0.34)	0.92 (0.85–0.99)	0.91 (0.73–1.1)	2.1 (0.55–8.0)
Valsalva	0.22 (0.03–0.41)	0.94 (0.88–1.0)	0.83 (0.64–1.1)	3.5 (0.97–12.6)
Distraction	0.44 (0.21–0.67)	0.90 (0.82–0.98)	0.62 (0.40–0.90)	4.4 (1.8–11.1)
Upper limb tension test A	0.97 (0.90–1.0)	0.22 (0.12–0.33)	0.12 (0.01–1.9)	1.3 (1.1–1.5)
Upper limb tension test B	0.72 (0.52–0.93)	0.33 (0.21–0.45)	0.85 (0.37–1.9)	1.1 (0.77–1.5)
Cervical flexion (<55°)	0.89 (0.74–1.0)	0.41 (0.29–0.53)	0.27 (0.07–1.0)	1.5 (1.2–2.0)
Involved rotation (<60°)	0.89 (0.74–1.0)	0.49 (0.37–0.62)	0.23 (0.06–0.85)	1.8 (1.3–2.4)

Sensitivity = Sn; specificity = Sp; negative likelihood ratios = LR-; positive likelihood ratios = LR+; 95 CI = 95% confidence intervals.

Relatie tussen een + testresultaat en de kans dat de aandoening er is; de LR+ moet zo hoog mogelijk zijn (1-2; 2-5; 5-10; >10).

Variable	Sn 95 CI	Sp 95 CI	LR- 95 CI	LR+ 95 CI
C5 Dermatome	0.29 (0.08–0.51)	0.86 (0.77–0.94)	0.82 (0.60–1.1)	2.1 (0.79–5.3)
C6 Dermatome	0.24 (0.03–0.44)	0.66 (0.54–0.78)	1.16 (0.84–1.6)	0.69 (0.28–1.8)
C7 Dermatome	0.18 (0.0–0.36)	0.77 (0.66–0.87)	1.07 (0.83–1.4)	0.76 (0.25–2.3)
C8 Dermatome	0.12 (0.0–0.27)	0.81 (0.71–0.90)	1.09 (0.88–1.4)	0.61 (0.15–2.5)
T1 Dermatome	0.18 (0.0–0.36)	0.79 (0.68–0.89)	1.05 (0.81–1.4)	0.83 (0.27–2.6)
MMT deltoid	0.24 (0.03–0.44)	0.89 (0.81–0.97)	0.86 (0.65–1.1)	2.1 (0.70–6.4)
MMT biceps brachii	0.24 (0.03–0.44)	0.94 (0.88–1.0)	0.82 (0.62–1.1)	3.7 (1.0–13.3)
MMT extensor carpi radialis longus/brevis	0.12 (0.0–0.27)	0.90 (0.83–0.98)	0.98 (0.81–1.2)	1.2 (0.27–5.6)
MMT triceps brachii	0.12 (0.0–0.27)	0.94 (0.88–1.0)	0.94 (0.78–1.1)	1.9 (0.37–9.3)
MMT flexor carpi radialis	0.06 (0.0–0.17)	0.89 (0.82–0.97)	1.05 (0.91–1.2)	0.55 (0.07–4.2)
MMT abductor pollicis brevis	0.06 (0.0–0.17)	0.84 (0.75–0.93)	1.12 (0.95–1.3)	0.37 (0.05–2.7)
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Spurling's B	0.50 (0.27–0.73)	0.74 (0.63–0.85)	0.67 (0.42–1.1)	1.9 (1.0–3.6)
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Involved rotation (<60°)	0.89 (0.74–1.0)	0.49 (0.37–0.62)	0.23 (0.06–0.85)	1.8 (1.3–2.4)

Sensitivity = Sn; specificity = Sp; negative likelihood ratios = LR-; positive likelihood ratios = LR+; 95 CI = 95% confidence intervals.

In geval van een lage – LR (bijvoorbeeld 0,12) is een test (bijv. ULTT A) te gebruiken als excluderende test.

Vraag 3:
Wat is de waarde van tabel 5?

Table 5. Test Item Cluster for the Diagnosis of Cervical Radiculopathy

Criteria for a Positive Test	Sn 95 CI	Sp 95 CI	LR+ 95 CI	Post-test Probability
Two positive tests	0.39 (0.16–0.61)	0.56 (0.43–0.68)	0.88 (1.5–2.5)	21%
Three positive tests	0.39 (0.16–0.61)	0.94 (0.88–1.0)	6.1 (2.0–18.6)	65%
All four tests positive	0.24 (0.05–0.43)	0.99 (0.97–1.0)	30.3 (1.7–538.2)	90%

ULTTA, involved cervical rotation <60°, Distraction, and Spurling's A. Sensitivity (Sn), Specificity (Sp), and Positive Likelihood Ratio (LR+) of clinical examination variables with 95% confidence intervals (95 CI). The associated post-test probability values for each criteria level is based on a pre-test probability of 23%.

- Voorafkans op CR in deze populatie: 23%.
- 1 of 2 + tests: geen meerwaarde!
- In deze populatie blijkt het clusteren van tests zinvol:
 - 3 + tests: kans op CR neemt toe tot 65%;
 - 4 + tests: kans op CR neemt toe tot 90%.

Vraag 4:
Uitvoering van de klinische tests?

Foto's tonen correcte uitvoering tests.



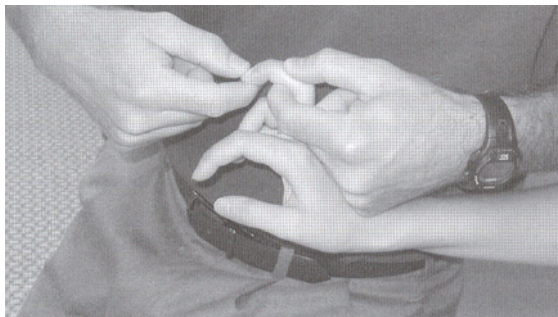
3. DIAGNOSTIEK CM.



- CM kent breed klachtenbeeld; initiële symptomen zijn vaak a-specifiek.
- Soms langzaam beloop (ook bij de FT?); soms snel na trauma (niet vaak bij de FT).
- Er bestaat een EMS: Europese Myelopathie Score (niet voor FT).
- Er is nog geen diagnostische CPR.

FT lichamelijk onderzoek.

- Observatie / functioneel bewegen: matig looppatroon.
- AROM / PROM: beperkte mobiliteit (maar meestal geen directe provocatie; *soms bij retroflexie o.b.v. spondylose*).
- Neuropatische aspecten: paresthesieën, schietende pijn, 'vreemde' sensaties.
- Hyperreflexie / pathologische reflexen.
- Positieve coördinatie / balans tests.



Hoffman

Normal toe flexion



Positive Babinski's reflex



Babinski

Bednarek et al (Spine, 2004:2260-9):

.... *'the strongest predictor of CM is an episode of CR in the past'.*



4. KLINISCHE RELEVANTIE DIAGNOSTIEK



- Wat is het belang van het vaststellen c.q. inschatten van de diagnose CR of CM of CMR?
- Heeft het invloed op ons klinisch handelen?

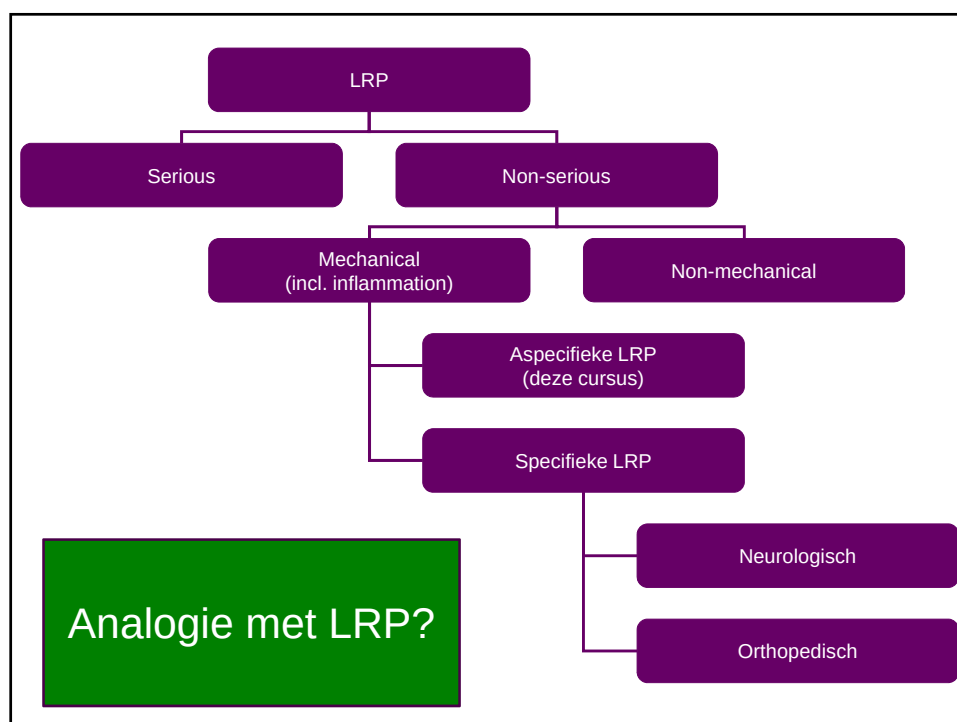


Hebben we de prioriteiten goed op de rij ???

Table 9.1 Differentiation of referred pain characteristics

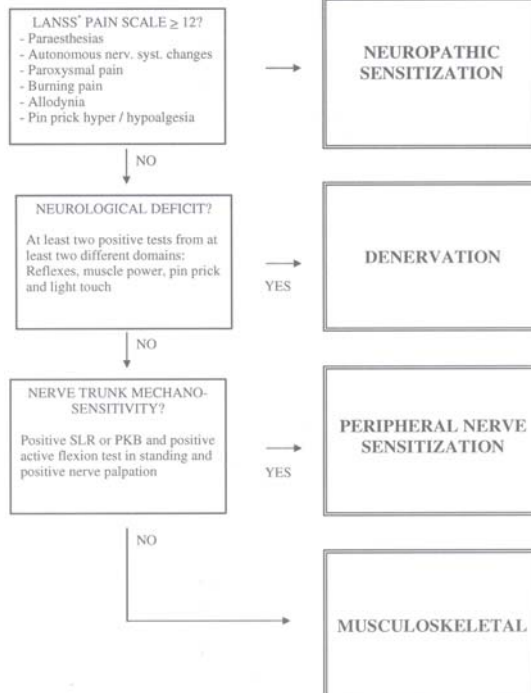
Characteristic	Radiculopathy	Myelopathy	Somatic referred pain	Visceral pain
Axial Distribution	+	+	+	+
Upper Extremity Muscle Weakness	+	+	—	—
Lower Extremity Muscle Weakness	+	+	—	—
Upper Extremity Sensory Disturbance	+	+	—	—
Lower Extremity Sensory Disturbance	+	+	—	—
Clumsiness	—	+	—	—
Gait Disturbance	+ or —	+	—	—
Spurling's Sign	+	—	+ or —	—
Sensory Deficit	+ or —	+ or —	—	—
Loss of Vibratory Sense	—	Yes (LE)	—	—
Tendon Reflex Changes	Diminished + or —	Increased	—	—
Muscle Wasting	Unilateral + or —	Bilateral	—	—
Babinski Sign	—	+	—	—
Hoffman's Sign	—	+	—	—
Muscle Tone	Normal	Increased	Normal	Normal
Limb Tension Test	+	+ or —	—	—

CLASSIFICATION	EXAMINATION FINDING	PROPOSED INTERVENTIONS
Cervical hypomobility	Restricted AROM Restricted PIVM testing cervical or upper thoracic No UE radicular symptoms Sudden or gradual onset	AROM exercises Cervical and thoracic mobilization/ manipulation isometric or thrust manipulation techniques Nonthrust manipulation
Cervical radiculopathy	Positive Spurling's A test Positive neck distraction test Positive ULNT 1 <60 degrees ipsilateral neck rotation	Cervical traction (manual/mechanical) ULNT 1 AROM Thoracic spine manipulation Postural exercises
Clinical instability	Remote history of trauma Symptoms provoked with sustained weight-bearing posture Symptoms relieved with non-weight-bearing postures Hypermobility with loose end feel of mid cervical segments Poor strength (2/5) of cervical spine multifidus, longus colli, and longus capitis muscles Shaking/poorly controlled (aberrant) motion with cervical active range of motion Greater cervical active range of motion in supine (non-weight-bearing) position than in standing (weight-bearing) position	Postural education Cervical stabilization exercise program Mobilization/manipulation above and below hypermobilities Ergonomic corrections
Acute pain (including whiplash)*	High pain and disability scores Recent history of trauma Referred symptoms into upper quarter Poor tolerance to examination and most interventions	Gentle AROM within patient tolerance Activity modification to control pain Relative rest Physical modalities Intermittent use of cervical collar Gentle manual therapy and exercises, but avoidance of pain-inducing manual therapy techniques or exercises
Cervicogenic headache	Unilateral headache with onset preceded by neck pain Headache pain triggered by neck movement or positions Headache pain elicited by pressure on posterior neck, especially at 1 of 3 upper cervical joints ³⁵	Cervical and thoracic mobilization/ manipulation Strengthening neck and postural muscles Postural education



Klasseren beenpijn bij LRP.

Model van
Axel Schäfer
(2009 – 2011)



LANSS' PAIN SCALE ≥ 12?
- Paraesthesias
- Autonomus nerv. syst. changes
- Paroxysmal pain
- Burning pain
- Allodynia
- Pin prick hyper / hypoalgesia

NEUROPATHIC
SENSITIZATION

Behandelen van
neuropatische pijn.

NEUROLOGICAL DEFICIT?
At least two positive tests from at
least two different domains:
Reflexes, muscle power, pin prick
and light touch

DENERVATION

Consultatie
medisch specialist.

NERVE TRUNK MECHANO-
SENSITIVITY?
Positive SLR or PKB and positive
active flexion test in standing and
positive nerve palpation

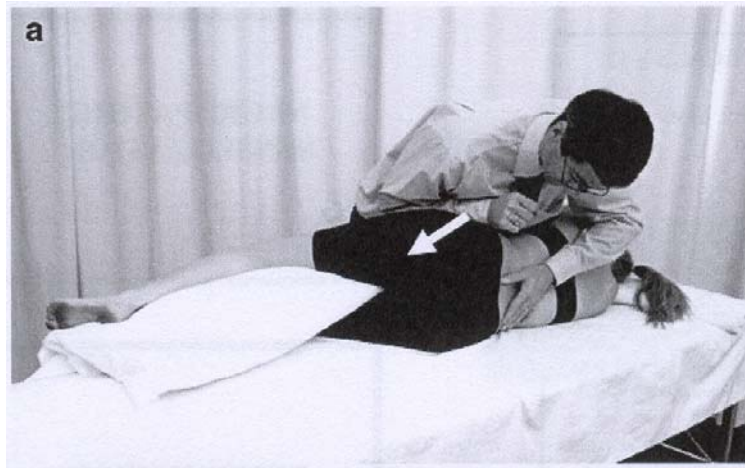
PERIPHERAL NERVE
SENSITIZATION

Behandelen met
'neurogene' mobilis.

MUSCULOSKELETAL

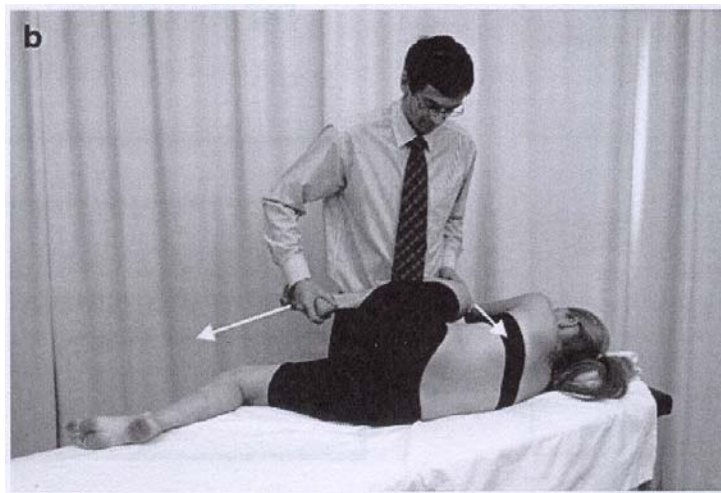
FT / MT analyse
mogelijke oorzaken.

Mobilisatie neurogeen weefsel – techniek 1.



Openen van de bovenliggende foramina; evt. rol onder re zij.

Mobilisatie neurogeen weefsel – techniek 2.



Slider techniek; van flexie heup / knie naar extensie heup / knie.

**Onderzoek Schäfer et al (2011), n= 74, Hamburg;
beste resultaten mobilisatie in PNS groep.**

Table 2 Proportion of subjects from each group that attain the minimal clinically important change (MCIC) in each and all three of the outcome measures

MCIC	NS (n = 19)	D (n = 27)	PNS (n = 9)	M (n = 19)	χ^2 ^b	p value ^b
Pain NRS	11% (n = 2)	15% (n = 4)	56% (n = 5)	16% (n = 3)	7.29	0.057
GPC	16% (n = 3)	33% (n = 9)	78% (n = 7)	16% (n = 3)	12.20	0.005
RMDQ	67% (n = 12) ^a	67% (n = 18)	89% (n = 8)	42% (n = 8)	6.10	0.104
Responder	11% (n = 2)	15% (n = 4)	56% (n = 5)	11% (n = 2)	7.98	0.031 ^c

NS central sensitization, D denervation, PNS peripheral nerve sensitization, M musculoskeletal, NRS numerical rating scale, GPC global perceived change, RMDQ Roland Morris Disability Questionnaire, Responder achieved MCIC in all three of the outcome measures

Indeling in nek-armpijn.

- Nek-arm pijn met neurale symptomen
- grondvorm: neuropatisch / nocisensorisch
*schietend – paresthesieën – hyperesthesie -
distale pijn overheerst*
>>>> eerder overleg met medici gewenst....
- Nek-armpijn zonder neurale symptomen
- grondvorm: nocisensorisch
*voorspelbaar – hyperalgesie – zeurend –
proximale pijn overheerst*
>>>> typische FT / MT expertise



5. BEHANDELING CR.



- Zijn er relevante subdoelstellingen voor behandeling bij CR patiënten waarbij FT / MT geïndiceerd is?
- Is er enige externe evidentie voor de toepassing van FT / MT bij CR patiënten?

Vraag 5:
Evaluatieve metingen en de MCIC's?

Meetinstrumenten / MCIC's.

- *NDI* : 7 punten.
- *PSFS*: 2 punten (20 op schaal 0-100)
- *NRPS*: 2 punten (20 op schaal 0-100)
- *GROC*: alleen +5, +6 en +7 scoren
(-7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7)

Table 4.

Reexamination and Change Scores for the Neck Disability Index, the Patient-Specific Functional Scale, the Numeric Pain Rating Scale, and the Global Rating of Change

Scale or Rating	$\bar{X}$ (SD)			Difference in Change Scores (95% Confidence Interval)	P
	All Subjects (N=96)	Successful Subjects (n=50)	Unsuccessful Subjects (n=46)		
Neck Disability Index					
Initial examination	28.6 (9.2)	29.2 (9.0)	28.1 (9.5)		
Reexamination	15 (10.0)	10.9 (8.5)	19.5 (9.6)		
Change score	13.9 (10.5)	18.9 (8.5)	8.4 (9.7)	10.5 (6.8, 14.2)	<.001
Patient-Specific Functional Scale					
Initial examination	4.2 (1.3)	4.0 (1.2)	4.5 (1.3)		
Reexamination	7.5 (2.0)	8.3 (1.1)	6.6 (2.2)		
Change score	3.4 (1.9)	4.4 (1.2)	2.4 (2.0)	2.0 (1.3, 2.6)	<.001
Numeric Pain Rating Scale					
Initial examination	6.5 (2.4)	6.8 (1.6)	6.3 (3.0)		
Reexamination	2.8 (2.5)	2.2 (1.2)	3.5 (3.4)		
Change score	3.8 (2.1)	4.5 (1.9)	2.9 (2.3)	1.6 (0.80, 2.4)	<.001
Global Rating of Change					
Reexamination	3.8 (1.9)	4.6 (1.3)	2.9 (2.2)	1.7 (0.96, 2.4)	<.001

Vraag 6:
Hoe lang / frequent wordt er behandeld?

Gemiddeld 6
behandelingen (4 -13)
in 4 weken.

Vraag 7:
Waarde van multimodaal behandelen;
hoe vaak wordt cerv. HVT toegepast?

Table 3.
Specific Treatments Received by Each Group of Subjects

Treatment	No. (%) of Subjects			p ^a
	All Subjects Receiving Treatment (N=96)	Successful (n=50)	Unsuccessful (n=46)	
Cryotherapy	30 (31)	13 (26)	17 (37)	.28
Moist heat	33 (34)	14 (28)	19 (41)	.20
Ultrasound	16 (17)	6 (12)	10 (22)	.27
Electrical stimulation	20 (21)	8 (16)	12 (26)	.32
Active range of motion (including cervical retraction)	69 (72)	36 (72)	33 (72)	1.0
Stretching	52 (54)	26 (52)	26 (57)	.90
Strengthening (scapula/upper extremity)	47 (49)	25 (50)	22 (48)	.84
Strengthening (deep neck flexor muscles)	38 (40)	23 (46)	15 (33)	.21
Aerobic activity	30 (31)	15 (30)	15 (33)	.83
Functional activity	29 (30)	15 (30)	14 (30)	1.0
Traction, manual	34 (35)	20 (40)	14 (30)	.39
Traction, mechanical	53 (55)	33 (66)	20 (43)	.03
Total duration in min, $\bar{X}$ (SD, range)	17.7 (2.4, 15–20)	17.8 (2.3, 15–20)	17.5 (2.6, 15–20)	
Pounds, $\bar{X}$ (SD, range)	24.6 (2.9, 20–28)	24.3 (3.2, 20–28)	25.2 (2.5, 20–28)	
Muscle coeergy techniques	28 (29)	13 (26)	15 (33)	.51
Nonthrust manipulation of the cervical spine	47 (49)	27 (54)	20 (43)	.32
Nonthrust manipulation of the thoracic spine	40 (42)	23 (46)	17 (37)	.44
Thrust manipulation of the cervical spine	0 (0)	0 (0)	0 (0)	—
Thrust manipulation of the thoracic spine	27 (28)	18 (36)	9 (20)	.04
Soft-tissue mobilization	35 (36)	14 (28)	23 (50)	.06
Neural mobilization	23 (24)	13 (26)	10 (22)	.64
Multimodal treatment including manual therapy, cervical traction, and deep neck flexor muscle strengthening for at least 50% of visits	43 (45)	31 (62)	12 (26)	.001 ^b

^a As determined by chi-square tests. —=unable to calculate.
^b As determined by independent t tests.

BOX 3-5 Absolute Contraindications to Manipulation

Lack of indications
 Poor integrity of ligamentous or bony structures from recent injury or disease process
 Unstable fracture
 Bone tumors
 Infectious disease
 Osteomyelitis
 Vertebral basilar insufficiency (cervical spine)
 Rheumatoid arthritis (upper cervical spine)
 Use of anticoagulant medication

BOX 3-6 Relative Contraindications to Manipulation

Osteoporosis
 Herniated disc with radiculopathy
 Signs of spinal instability
 Rheumatoid arthritis
 Pregnancy

Table 6.

Combination of Predictor Variables Identified in the Logistic Regression Analysis and Associated Accuracy and 95% Confidence Intervals (CI) of Individual Predictor Variables for Identifying Success^a

No. of Predictor Variables Present	Sensitivity (95% CI)	Specificity (95% CI)	Positive Likelihood Ratio (95% CI)	% Probability of Success
4+	0.18 (0.07, 0.29)	0.98 (0.94, 1.0)	8.3 (1.9, 63.9)	90.4
3+	0.68 (0.55, 0.81)	0.87 (0.77, 0.97)	5.2 (2.4, 11.3)	85.4
2+	0.94 (0.87, 1.0)	0.37 (0.23, 0.51)	1.5 (1.2, 1.9)	62.9
1+	1.0 (1.0, 1.0)	0.08 (0.01, 0.2)	1.1 (1.0, 2.0)	55.4

^a The probability of success was calculated as positive likelihood ratios and assumed a pretest probability of 53%. The 4 predictor variables were age (<54 y); dominant arm is not affected; looking down does not worsen symptoms; and multimodal treatment including manual therapy, cervical traction, and deep neck flexor muscle strengthening for at least 50% of visits.

- Voorafkans op goede responder: 53%.
- Goede responder: op alle 4 de metingen minimaal de MCIC vooruitgegaan.
- Bij 3 of 4 + prognostische factoren neemt de kans op succes relevant toe.

Andere vraag:

Is er verschil in het behandelen van CR patiënten met FT / MT of ACDF?



Relevante vragen.

- Bij welke kenmerken ('sings & symptoms') is FT / MT geïndiceerd?
- Bij welke kenmerken is medisch onderzoek geïndiceerd?
- Wanneer is de expertise van een wervelkolom chirurg geïndiceerd?

Verschil effectiviteit PT/MT en ACDF?

Peolsson A et al. Physical function outcome in CR patients after PT alone compared with anterior surgery followed by PT: a prospective randomized study with a two year follow-up. Spine, ahead of publication, 2012.

- 63 Patients with CR (Mn age: 46 years) after CDD (Cervical Disc Disease) were randomized:
 - n=31: ACDF followed by PT / MT,
 - n=32: PT / MT alone.
- PT program: 14 weeks, twice per week, beside exercises also strong focus up on treatment of cognitive-behavioral aspects.
- 5 Functional measures: AROM, NME (Neck Muscle Endurance), hand strength, manual dexterity, arm elevation with neck extension.

Verschil effectiviteit PT/MT en ACDF?

Peolsson A et al. Physical function outcome in CR patients after PT alone compared with anterior surgery followed by PT: a prospective randomized study with a two year follow-up. Spine, ahead of publication, 2012.

- Measures at baseline – 3 months – 6 months – 1 year – 2 years.
- At baseline no differences.
- Both groups increased significantly & relevantly from the baseline results.
- At none of the measurement moments differences between groups were present.



6. AFSLUITING, ADVIEZEN.



1. Nek – arm pijn (NAP) komt veel voor.
2. CR & CM zijn specifieke vormen van NAP.
3. CR is klinisch goed te diagnosticeren m.b.v. van het cluster c.q. exclusie criterium.
4. CR & CM leiden tot gericht FT / MT beleid.
5. Bij CP & CM patiënten is samenwerking FT / MT en medisch specialist belangrijk.
6. Multimodaal behandelen is geïndiceerd.