Federaal Kenniscentrum voor de Gezondheidszorg
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Aspecifieke nekpijn: diagnose en behandeling

KCE reports 119A

Federaal Kenniscentrum voor de Gezondheidszorg
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KCE rapporten 119A

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VOORWOORD

Het KCE-rapport "Chronische lage rugpijn" werd en wordt nog steeds zeer veel on-line geconsulteerd, zowel in België als in het buitenland. De veroudering van onze bevolking, gekoppeld aan een toenemend sedentair leven, heeft een negatieve invloed op het aantal gewrichtsklachten in ons land en derhalve ook op de gezondheidszorg en indirecte kosten die hiermee samenhangen.

Met dit rapport over aspecifieke nekpijn gaat het KCE verder op de ingeslagen weg. Talrijke zorgverleners worden geconfronteerd met deze klacht; vandaar dat dit rapport het resultaat is van een wetenschappelijke samenwerking tussen deskundigen uit verschillende vakgebieden zoals fysische geneeskunde, algemene geneeskunde, anesthesie, neurochirurgie. Wij wensen het team van het Centrum voor huisartsgeneeskunde van de Universiteit Antwerpen te danken voor het nauwgezette werk dat ze uitvoerden in het kader van deze systematische review van de wetenschappelijke literatuur.

Er bestaat een uitgebreid gamma diagnostische en vooral therapeutische middelen: het lijkt dus van doorslaggevend belang om aan de zorgverleners in de praktijk klinische informatie te bezorgen die gebaseerd is op het meest recente bewijsmateriaal. Wij hopen dat dit werk kan bijdragen tot een optimale verzorging van nekpijn, tot de verbetering van de levenskwaliteit van diegenen die eronder lijden en tot een minimalisering van het aantal nutteloze behandelingen dat bij deze patiënten enkel valse hoop kan opwekken.

Jean-Pierre Closon

Algemeen Directeur a.i.

Samenvatting en toelichtingen

INLEIDING

Deze studie heeft als doel een systematisch overzicht te geven van de wetenschappelijke literatuur over diagnose, prognose en behandeling van acute en chronische aspecifieke nekpijn. Het doel is evidence-based kernboodschappen voor te leggen voor het diagnosticeren en behandelen van volwassenen die lijden aan aspecifieke nekpijn.

Nekpijn is een erg ruim begrip waaronder aspecifieke nekpijn maar ook bijv. met nekpijn geassocieerde aandoeningen vallen. De symptomen zijn afhankelijk van de graad van fysieke activiteit en kunnen variëren in de loop van de tijd. Aspecifieke nekpijn kan worden gedefinieerd als elke vorm van acute, subacute of chronische nekpijn waarvoor geen abnormale anatomische structuur als reden kan worden geïdentificeerd. In de literatuur kon geen eenduidige definitie voor de begrippen acuut, subacuut of chronisch gevonden worden.

METHODOLOGIE

Het literatuuronderzoek spreidde zich uit over de periode van 1998 tot 2008 en omvatte (systematische) reviews, meta-analyses, richtlijnen, RCT's en klinische trials.

De onderzoekers doorzochten de wetenschappelijke literatuur in de Medline, Embase, PEDro en Cochrane databases. Bovendien werden bestaande richtlijnen opgezocht in specifieke databases. Alle documenten werden gescreend door een team van twee reviewers. Samen met het onderzoeksteam definieerde een multidisciplinair panel van deskundigen het niveau van bewijskracht van de conclusies met behulp van het "GRADE"-systeem.

- Graad A (hoog niveau van bewijskracht): RCT's zonder ernstige beperkingen of uitzonderlijk sterke bewijskracht uit observationele studies;
- Graad B (matig niveau van bewijskracht): RCT's met ernstige beperkingen (inconsequente, indirecte, of onnauwkeurige resultaten; methodologische gebreken) of zeer sterke bewijskracht uit observationele studies;
- Graad C (laag niveau van bewijskracht): lager niveau van bewijskracht.

Tenslotte werden de conclusies van dit overzicht vergeleken met die van twee richtlijnen van goede kwaliteit die tijdens het onderzoek werden geïdentificeerd.

RESULTATEN

Het onderzoek naar bewijskracht inzake diagnose en prognose leverde 135 mogelijk relevante publicaties op; 11 daarvan waren van goede kwaliteit en werden geselecteerd. Het onderzoek inzake behandeling leverde 654 referenties op, waaronder 55 reviews: 24 daarvan werden geselecteerd na beoordeling van de kwaliteit. Tenslotte werden ook 13 RCT's, gepubliceerd na de meest recente reviews van goede kwaliteit, opgenomen na beoordeling van de kwaliteit ervan.

BEOORDELING VAN NEK PIJN EN INVALIDITEIT

De "Neck Disability Index" is een gevalideerd instrument dat wijd en zijd gebruikt wordt voor het inschatten van de invaliditeit door de patiënten met nekpijn zelf. Deze index werd effectief gebruikt in zowel klinische omstandigheden als in research en werd vertaald in het Nederlands (maar niet in het Frans).

DIAGNOSE VAN ASPECIFIEKE NEKPIJN

Er werd geen systematische review van primaire studies gevonden over de diagnostische nauwkeurigheid van het afnemen van de anamnese of van diagnostische beeldvorming bij patiënten met aspecifieke nekpijn.

Uitsluiten van "red flags" en radiculaire aandoeningen (aandoeningen van de zenuwwortels)

"Red flags" zijn klinische tekens of symptomen die wijzen op de waarschijnlijkheid van een ernstige onderliggende oorzaak ("alarmsymptomen"). Het is belangrijk om de "red flags" (zie tabel 1 in het wetenschappelijke rapport) evenals pijn afkomstig van de zenuwwortel (radiculaire pijn/radiculopathie) uit te sluiten om de diagnose van "aspecifieke nekpijn" te bevestigen. De aanwezigheid van radiculaire pijn/radiculopathie (pijn door of aantasting van een zenuwwortel, veroorzaakt door compressie of andere aandoeningen) kan klinisch worden aangetoond door de test van Spurling, tractie/nekdistractie, de schouderabductietest en een valsalva manoeuvre (laag niveau van bewijskracht). Een negatieve upper limb tension test wijst op de afwezigheid van radiculaire pijn/radiculopathie (laag niveau van bewijskracht).

Diagnose van facetgewrichtpijn

Een lokaal anesthetisch blok kan nuttig zijn voor het diagnosticeren van nekpijn veroorzaakt door de facetgewrichten als onderliggende structuren (laag niveau van bewijskracht). Deze invasieve techniek zou echter alleen mogen worden toegepast indien de klinische diagnose twijfelachtig blijft: deze techniek leidt tot een hoog percentage vals-positieven en er bestaat een gebrek aan consensus over de definitie van een "succesvol anesthetisch blok" voor cervicale facetgewrichtpijn.

PROGNOSE

Er bestaat een beperkt aantal publicaties over prognostische factoren voor aspecifieke nekpijn. Er werden enkele indicatoren geïdentificeerd van een minder gunstige prognose (meer pijn, lager niveau van functioneren of minder goede algemene beterschap, hoger gebruik van gezondheidszorg, langduriger ziekteverlof). Deze indicatoren zijn bijv. leeftijd, het gelijktijdig optreden van lage rugpijn, de ernst van de pijn en een voorgeschiedenis van vroegere episodes van nekpijn (laag niveau van bewijskracht).

Onderzoek lijkt er op te wijzen dat radiologische bevindingen (bijv. degeneratieve veranderingen in de tussenwervelschijven of gewrichten) niet geassocieerd kunnen worden met een slechtere prognose (laag niveau van bewijskracht).

BEHANDELING

Voor veel behandelingsmodaliteiten is het erg moeilijk om conclusies te trekken aan de hand van het beschikbare bewijsmateriaal: de technieken worden niet altijd nauwkeurig beschreven, er is een gebrek aan wetenschappelijke literatuur voor sommige behandelingen en de studiepopulaties bestaan soms uit andere patiënten dan patiënten met aspecifieke nekpijn.

Manuele therapie

Of manipulatie en mobilisatie als enige behandelingsvorm voor acute of chronische aspecifieke nekpijn doeltreffend zijn, blijft twijfelachtig (matig niveau van bewijskracht). Manipulatie en/of mobilisatie binnen een multimodale aanpak (combinatie van minstens 2 verschillende therapiemodaliteiten, zie verder) waaronder ook lichaamsoefeningen blijken echter doeltreffend te zijn bij chronische aspecifieke nekpijn, zowel wat betreft pijn als wat betreft functionaliteit (hoog niveau van bewijskracht).

Lichaamsoefeningen onder toezicht van een zorgverlener kunnen doeltreffend zijn bij de behandeling van aspecifieke acute en chronische nekpijn (matig niveau van bewijskracht). De literatuur lijkt erop te wijzen, met een matig niveau van bewijskracht, dat versterkende oefeningen, stretching, proprioceptieve oefeningen (vb. oogfixatie) en dynamische weerstandsoefeningen doeltreffend kunnen zijn. Het voordeel van oefeningen thuis of in groep, en het voordeel van nekschool (voor heterogene groepen) worden door de wetenschappelijke literatuur niet ondersteund (laag niveau van bewijskracht).

Over massage kunnen geen conclusies worden getrokken wat betreft doeltreffendheid bij aspecifieke nekpijn, gezien de beperkingen in de bestaande studies. Het bewijsmateriaal voor mogelijke doeltreffendheid van specifieke massagetechnieken (bijv. traditionele Chinese massage) blijft onduidelijk (laag niveau van bewijskracht).

Voor cervicale tractie is het bestaande bewijsmateriaal beperkt en bewijzen voor mogelijk voordeel blijven nog onduidelijk.

Multimodale en multidisciplinaire interventies

Een multimodale behandeling bestaat uit de combinatie van minstens 2 verschillende therapiemodaliteiten die worden gebruikt voor aspecifieke nekpijn, bijvoorbeeld lichaamsoefeningen gecombineerd met mobilisatie en/of medicatie.

Voor multidisciplinaire benaderingen, methoden of behandelingen is een team van therapeuten uit verschillende disciplines nodig die ofwel samen, ofwel apart, voor dezelfde patiënt werken, maar dit zonder een gezamenlijk besproken doel.

Het korte- en langetermijnvoordeel van een multimodale zorgbenadering, zowel wat betreft pijn als wat betreft functie, wordt ondersteund door sterk bewijsmateriaal; deze aanpak bestaat onder meer uit lichaamsoefeningen (onder toezicht) gecombineerd met mobilisaties of manipulaties (hoog niveau van bewijskracht). Het is onduidelijk welke componenten van de interventie nu precies zorgen voor de doeltreffendheid van de behandeling (bijv. frequentie, duur, technieken). Wat betreft multidisciplinaire aanpak bestaat er onvoldoende onderzoek van goede kwaliteit in de literatuur.

Elektrotherapie en andere behandelingen uit fysische geneeskunde

Het is moeilijk om conclusies te trekken over elektrotherapie en andere behandelingen uit fysische geneeskunde omwille van het grote aantal interventies en het beperkte en vaak tegenstrijdige bewijsmateriaal.

Er is tegenstrijdige evidentie in verband met het nut van transcutane elektrische zenuwstimulatie (TENS) bij de behandeling van chronische aspecifieke nekpijn. Voor elektrische spierstimulatie of voor andere elektrotherapieën zoals galvanische of diadynamische stromen of iontophorese, is er beperkt bewijs dat er geen effect is op korte termijn op pijn (laag niveau van bewijskracht).

Voor elektromagnetische therapie (pulserende elektromagnetische velden (PEMF), repetitieve magnetische stimulatie) bestaat er beperkt bewijs voor een gunstig effect.

Repetitieve magnetische stimulatie heeft een gunstig effect op pijn en op functie op korte termijn in chronische nekpijn; voor PEMF geldt dit voor pijn onmiddellijk na de behandeling in geval van acute of chronische nekpijn (laag niveau van bewijskracht).

Er bestaat beperkte evidentie voor het nut van low-level laser therapie (LLLT) met infrarood golflengtes voor acute en/of chronische nekpijn (laag niveau van bewijskracht). LLLT neemt de pijn weg en heeft een positief effect op functionaliteit op korte termijn, zowel bij acute als bij chronische nekpijn. Voor andere types van lasertherapie bij patiënten met aspecifieke nekpijn is het gunstig effect niet bewezen.

Medicatie

Bij patiënten met aspecifieke nekpijn werd alleen specifieke medicatie bestudeerd. Er is bewijsmateriaal van matige kwaliteit over de voordelen van niet-narcotische analgetica waaronder NSAID's: ze hebben meer invloed op de pijn dan een placebo, maar hun voordelen in vergelijking met andere behandelingen, zoals manipulatie, zijn onduidelijk (laag niveau van bewijskracht). Het bewijsmateriaal voor het nut van psychotrope middelen (gebruikt als spierverslappers) is onduidelijk (laag niveau van bewijskracht).

Een plaatselijke verdovende injectie met lidocaïne in myofasciale trigger points lijkt doeltreffend te zijn voor chronische aspecifieke nekpijn (laag niveau van bewijskracht).

Andere behandelingen, zoals Botulinum toxine A (matig niveau van bewijskracht) en injectie of subcutane insufflatie van koolzuurgas (laag niveau van bewijskracht) hebben geen klinisch effect.

Andere behandelingen: acupunctuur, educatieve programma's, kussens, zachte kragen en orale splints

Er bestaat bewijsmateriaal van matige kwaliteit waaruit blijkt dat acupunctuur, en meer specifiek trigger point acupunctuur, zorgt voor pijnverlichting bij aspecifieke chronische nekpijn.

Educatieve programma's hebben volgens het bestaande bewijsmateriaal geen meerwaarde bij de behandeling van aspecifieke nekpijn in vergelijking met geen behandeling of andere behandelingen (matig niveau van bewijskracht). Specifieke educatieve programma's zouden doeltreffend kunnen zijn voor specifieke populaties, zoals een groepgebaseerde interventie of ergonomische counseling voor computerwerkers (laag niveau van bewijskracht).

Wat het gebruik betreft van zachte kragen of van orale splints (mondbeugels), is er matige evidentie dat dit geen voordeel meebrengt voor patiënten met aspecifieke nekpijn.

Het gebruik van kussens als geïsoleerde behandeling voor patiënten met chronische nekpijn wordt niet ondersteund door bewijsmateriaal. Kussens die werden gebruikt binnen het kader van een multimodale aanpak waaronder lichaamsoefening, hadden echter een positieve invloed op het verminderen van nekpijn (matig niveau van bewijskracht).

CONCLUSIE

De hoger vermelde conclusies werden vergeleken met de inhoud van twee richtlijnen van goede kwaliteit. De meeste conclusies van de huidige studie liggen in het verlengde van deze twee richtlijnen.

Bij de interpretatie van de resultaten moet echter rekening worden gehouden met volgende beperkingen. Ten eerste, "aspecifieke nekpijn" is een eerder breed en vaag begrip. Het identificeren van specifieke subgroepen zou mogelijk kunnen leiden tot meer doelgerichte diagnostische procedures en behandelingen. De beschikbare literatuur is momenteel ontoereikend om deze subgroepen af te bakenen.

Het is ook belangrijk te benadrukken dat er een grote heterogeniteit bestaat tussen de talrijke interventies die in de literatuur worden beschreven, en dat deze bovendien vaak onduidelijk gedefinieerd werden. Ook ontbrak bij veel studies de definitie van aspecifieke nekpijn evenals een gedetailleerde beschrijving van de behandelingsmodaliteiten (frequentie, duur).

Voor de farmacologische behandeling van aspecifieke nekpijn is het bewijsmateriaal erg beperkt: er is een tekort aan wetenschappelijke literatuur voor veel geneesmiddelen die frequent in de praktijk worden gebruikt. De conclusies over geneesmiddelen kunnen daarom aangevuld worden met algemene richtlijnen inzake pijn (zoals die van de American Geriatrics Society http://www.americangeriatrics.org/ of van de Société Scientifique de Médecine Générale http://www.ssmg.be).

Een team van experts in samenwerking met de auteurs van deze studie, evalueerden de diagnostische procedures en therapeutische interventies aan de hand van het GRADE-systeem (zie Tabel). Wanneer de gewenste effecten van een interventie duidelijk de ongewenste effecten (niet) compenseerden, achtte het panel het sterk aangewezen de interventie wel (of niet) uit te voeren. Het panel achtte de interventie slechts "beperkt" (of zwak) aangewezen, indien de verwachte effecten van de voorgestelde interventies minder zeker waren – ofwel omdat het bewijsmateriaal van slechte kwaliteit was, ofwel omdat er een onduidelijk evenwicht was tussen gewenste en ongewenste effecten. In dat geval moeten clinici de voordelen, risico's en neveneffecten voor de individuele patiënt zorgvuldig afwegen.

KERNBOODSCHAPPEN

De belangrijkste punten te weerhouden voor de evaluatie van patiënten met nekpijn zijn:

- Anamnese en klinisch onderzoek zijn belangrijk;
- "Red flags" dienen zorgvuldig uitgesloten te worden;
- Diagnostische oppuntstelling:
  - Er bestaat in de wetenschappelijke literatuur geen bewijs dat medische beeldvorming nuttig is bij het vaststellen van aspecifieke nekpijn. Bovendien zijn afwijkende radiologische bevindingen niet geassocieerd aan een slechtere prognose (laag niveau van bewijskracht);
  - Er bestaan bepaalde uitlokkende diagnostische maneuvers die kunnen gebruikt worden (laag niveau van bewijskracht).

Wat betreft de behandeling van patiënten met chronische aspecifieke nekpijn, is er in de wetenschappelijke literatuur slechts één behandeling waarvoor er een hoog niveau van bewijskracht bestaat: een multimodale behandeling (minstens 2 behandelingstechnieken) met lichaamsoefeningen (onder professioneel toezicht) geassocieerd aan mobilisaties of manipulaties.

Voor alle andere behandelingsmethodes zijn de literatuurgegevens van zwakke kwaliteit en/of laat de literatuur niet toe om een bepaalde techniek aan te bevelen op basis van een hoog niveau van bewijskracht.

AANBEVELING

Dit systematisch literatuuroverzicht geeft de meest recente wetenschappelijke bevindingen weer wat betreft diagnostische procedures en behandeling van aspecifieke nekpijn. Het KCE beveelt aan om de evidentie die in dit rapport vermeld wordt te gebruiken voor het uitwerken van richtlijnen door Belgische wetenschappelijke organisaties van artsen, kinesitherapeuten en andere zorgverleners. De wetenschappelijke boodschap van deze toekomstige richtlijnen dient het accent te leggen op het nut van multimodale aanpak (lichaamsoefeningen onder professioneel toezicht gecombineerd met mobilisaties of manipulaties) voor de behandeling van aspecifieke chronische nekpijn.

Voorgestelde interventie(s)	**Niveau van bewijskracht A, B, C; best beschikbare of geen bewijsmateriaal uit de literatuur**	**"Sterk" of "zwak" en "voor" of "tegen"**
Diagnose en prognose		
Anamnese	Geen bewijsmateriaal uit de literatuur	Sterk - Voor
Uitsluiten "Red flags" (alarmsymptomen)	Best beschikbare bewijsmateriaal uit de literatuur	Sterk - Voor
Diagnostische beeldvorming	Geen bewijsmateriaal uit de literatuur	Zwak - Tegen
De "Neck Disability Index" als instrument voor inschatten van invaliditeit door de patiënt	Niveau van bewijskracht niet van toepassing- Gevalideerd instrument	Sterk - Voor
Bevestigen radiculaire pijn/radiculopathie: test van Spurling - tractie/nekdistractie – schouder abductie – valsalvamanoeuvre	C	Zwak - Voor
Uitsluiten radiculaire pijn/radiculopathie: Negatieve Upper Limb Tension test	C	Zwak - Voor
Diagnose facetgewrichtpijn: Lokaal anesthetisch blok indien geen klinische diagnose mogelijk	C	Zwak - Voor
Ongunstige prognostische elementen: ernstige pijn, vroegere opstoten; ouderdom of geassocieerde lage rugpijn	C	Zwak - Voor
Afwijkende radiologische bevindingen (vb. degeneratieve tekens) zijn geassocieerd aan een slechtere prognose	C	Zwak - Tegen

Behandeling van aspecifieke nekpijn (ASNP)		
Chronische ASNP -Multimodale behandeling: mobilisaties/manipulaties gecombineerd met lichaamsoefeningen onder professioneel toezicht	Effect op pijn/functie op korte en lange termijn (A)	Sterk - Voor
Chronische ASNP -Manipulatie/mobilisatie gecombineerd met andere modaliteiten	Geen effect (C)	Zwak - Tegen
Chronische ASNP -Lichaamsoefeningen onder toezicht: stretching en versterkende programma's bijv. voor de nekregio	Effect op pijn/functie op lange termijn (B)	Zwak - Voor
Chronische ASNP -Lichaamsoefeningen onder toezicht: stretching met versterking van de schouderzone en de algemene toestand	Effect op functie op korte termijn (C)	Zwak - Voor
Chronische ASNP -Lichaamsoefeningen onder toezicht: oogfixatieoefeningen en proprioceptieve oefeningen	Effect op pijn/functie op korte termijn (B)	Zwak - Voor
Acute en chronische ASNP –Manipulatie/mobilisatie alleen	Geen effect (B)	Zwak - Tegen
Chronische ASNP -Tractie	Geen effect (C)	Zwak - Tegen
Acute en chronische ASNP -Massage	Geen conclusie (C)	Zwak - Tegen
Chronische ASNP -Geïsoleerde oefeningen thuis, geïsoleerde groepsoefeningen, niet-multidisciplinaire traditionele nekscholen	Geen effect (C)	Zwak - Tegen
Acute en chronische ASNP -Low Level Laser Therapie (LLLT) – Pulserende elektromagnetische velden (PEMF)	Effect op korte termijn op pijn/functie (LLLT); op pijn (PEMF) (C)	Zwak - Voor
Chronische ASNP -TENS (transcutane electrische zenuwstimulatie)– EMS (electrische spierstimulatie) op trigger points	Geen effect (C)	Zwak - Tegen
Chronische ASNP -Multidisciplinaire benadering	Geen conclusie (C)	Zwak - Voor
Acute en chronische ASNP -Paracetamol, NSAID's, opioïden analgetica	Effect op pijn op korte termijn (C)	Zwak - Voor
Chronische ASNP -Lokale anesthetische injectie met lidocaïne in myofasciale triggerpunten	Effect op pijn op korte termijn C)	Zwak - Voor
Chronische ASNP -Botulinum toxine A	Geen effect (B)	Zwak - Tegen
Acute ASNP -Subcutane insufflatie van koolzuurgas	Geen effect (C)	Zwak - Tegen
Acute en chronische ASNP -Geïsoleerde educatieve programma's	Geen effect (B)	Zwak - Tegen
Chronische ASNP -Kussens gecombineerd met oefeningen	Effect op pijn op korte en lange termijn (C)	Zwak - Voor
Chronische ASNP -Acupunctuur (v.b. op triggerpunt)	Effect op pijn op korte termijn (B)	Zwak - Voor
Chronische ASNP -Gebruik van kraag of orale splint	Geen effect (B)	Zwak - Tegen

Scientific summary

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1 INTRODUCTION

1.1 PURPOSE OF THE STUDY

This study aims to review scientific literature on diagnosis, prognosis and treatment of acute, subacute and chronic non-specific neck pain. The objective is to offer an overview of the currently available evidence to primary care and specialized practitioners involved with adults who suffer from non-specific neck pain.

1.2 NON-SPECIFIC NECK PAIN: DEFINITION AND EPIDEMIOLOGY

1.2.1 Definition

Neck pain is a wide concept and many definitions exist. In this report non-specific neck pain is defined in accordance to established guidelines, high quality systematic reviews, key text books, search on the topic in Pubmed and discussion with experts [1-5]:

Non-specific neck pain can be defined as simple (non-specific) neck pain without specific underlying disease causing the pain. Symptoms vary with physical activity and over time. Each form of acute, subacute or chronic neck pain, where no abnormal anatomic structure; as cause of pain, can be identified, is non-specific neck pain. There are different opinions about duration of symptoms but according to Binder, neck pain can be acute (< 4 weeks duration), sub-acute (1-4 months duration) or chronic (> 4 months duration) [1].

The symptoms of non-specific neck pain are very similar to the symptoms of whiplash associated disorders grades one and two (WAD I-II). Whiplash is an acceleration-deceleration mechanism of energy transfer to the neck and can result in injury to bony or soft tissue. The clinical symptoms, known as whiplash associated disorders, are for grade I 'pain, stiffness and tenderness in the neck, but no physical signs' and for grade II 'neck complaints and other musculoskeletal complaints (e.g., a decreased range of motion and tender spots)' [6]. The WAD's can also include headache and numerous other symptoms e.g. dizziness, tinnitus, sleep disturbance, mood disturbance, pain in areas outside the neck. Therefore, as also mentioned in the methodology section, literature on WAD will be excluded in this review. However, although it is not our purpose to review WAD primary literature, probably the systematic reviews and primary RCT's to be retrieved will not always allow us to separate this subgroup out from non-specific neck pain. In this case, these data will be accepted.

Non-specific neck pain can be diagnosed on clinical grounds alone, provided there are no features (for example Table 1: 'Red flags') to suggest more serious conditions [1]. The red flags proposed in table 1 are based on a good quality guideline already mentioned above [3], and represent the best available evidence in the field.

Table 1: Best available evidence of 'Red flags' for neck pain (clinical features that indicate an increased risk of specific conditions that can present with neck pain and require urgent attention) (http://www.cks.nhs.uk/neck_pain_non_specific)

A serious underlying cause is more likely in people presenting with:

- New symptoms before the age of 20 years or after the age of 55 years
- Weakness involving more than one myotome or loss of sensation involving more than one dermatome
- Intractable or increasing pain

'Red flags' that suggest compression of the spinal cord (myelopathy):

- Insidious progression
- Neurological symptoms: gait disturbance, clumsy or weak hands, or loss of sexual, bladder, or bowel function
- Neurological signs:
  - Lhermitte's sign: flexion of the neck causes an electric shock-type sensation that radiates down the spine and into the limbs.
  - Upper motor neuron signs in the lower limbs (Babinski's sign-up-going plantar reflex, hyperreflexia, clonus, spasticity)
  - Lower motor neuron signs in the upper limbs (atrophy, hyporeflexia)
- Sensory changes are variable, with loss of vibration and joint position sense more evident in the hands than in the feet

'Red flags' that suggest cancer, infection, or inflammation:

- Malaise, fever, unexplained weight loss
- Pain that is increasing, is unremitting, or disturbs sleep
- History of inflammatory arthritis, cancer, tuberculosis, immunosuppression, drug abuse, AIDS, or other infection
- Lymphadenopathy
- Exquisite localized tenderness over a vertebral body

'Red flags' that suggest severe trauma or skeletal injury:

- A history of violent trauma (e.g. a road traffic accident) or a fall from a height. However, minor trauma may fracture the spine in people with osteoporosis
- A history of neck surgery
- Risk factors for osteoporosis: premature menopause, use of systemic steroids

'Red flags' that suggest vascular insufficiency:

- Dizziness and blackouts (restriction of vertebral artery) on movement, especially extension of the neck when gazing upwards
- Drop attacks

1.2.2 Importance of neck pain

1.2.2.1 Epidemiology in Belgium and in the international literature

Data on neck pain are scarce in Belgium. The only available data for Flanders come from Intego, a network of general practitioners established since 1990 by the academic general practice centre at the university of Leuven (Katholieke Universiteit Leuven, KUL). Over fifty practices of general practitioners (GPs) work with an electronic medical file Medidoc®. Data are registered automatically and include reasons for contact, diagnoses, laboratory tests and medical prescriptions. Based on the results of Intego (www.intego.org and www.intego.be), the "neck syndrome", with ICPC code L83 (includes diagnosis 'non-specific neck pain') is in the top 20 of most frequent diagnoses in the period of 1994-2006. The estimated incidence of neck syndromes (including non-specific neck pain) was 24.84 ‰ for the yearly contact population in that period. Women suffered more frequently from this symptom (31.48 ‰, 7th reason for contact) than men (18.43 ‰, 9th reason for contact). These incidences refer to the population who consult their GP and so can be an underestimation of the incidence of non-specific neck pain in the general population in Belgium.

In the international literature prevalence studies show variation in results [7-11]. For instance, in a Swedish population-based study of 8356 subjects (6000 respondents i.e.72%) 43 % (48% of women and 38% of men) of the population reported neck pain. Chronic neck pain defined as continuous pain of more than 6 months duration, was more common in women (22%) than in men (16%). More than one fourth of the cases with chronic symptoms had a history of neck or head trauma and one third of these had sustained a whiplash type injury [10]. These figures reinforce the conclusion of the systematic review of Fejer [9] i.e. the higher prevalence of neck pain in Scandinavian countries than in other European countries. Fejer et al. concluded that the prevalence increases with longer prevalence periods [9]. The point prevalence in the Fejer review [9] for the adult population (15-74 years) ranged from 5.9 to 22.2 % (mean= 7,6%). In the USA the point prevalence of neck pain is 4.4% (4.1 to 4.7% in a population of 29,828 interviewees) with 3.9 % (3.5-4.3%) in men and 4.8% in women (4.4-5.2%) [11]. The Task Force on neck pain (2008) reported that depending on the case definitions used, the 12-month prevalence of neck pain ranged from 12.1% to 71.5% in the general population, and from 27.1% to 47.8% in workers. However, neck pain with associated disability was less common: 12-month prevalence estimates ranged from 1.7% to 11.5% in the general population [6].

1.2.2.2 Consequences of neck pain

Chronic neck pain may lead to substantial medical consumption, absenteeism from work and disability [7]. Whatever the duration of neck pain, pain can impair functional capacity, quality of life and can cause worry, anxiety and depression. Consequently, neck pain places a heavy burden on individuals, employers and health care services [1, 7, 10, 12]. Non-specific neck pain is not just a clinical problem, it can develop into a complex disorder where physical, psychological, social, compensation and other possible forces interact to cause and lead to maintained disability [12].

2 METHODOLOGY

The objective of this scientific summary is to answer the following research question: "What are the most accurate diagnostic procedures, prognostic factors and therapeutic interventions for adults with acute, subacute or chronic non-specific neck pain?" The existing scientific literature for non-specific neck pain is reviewed and critically assessed.

2.1 SELECTION CRITERIA

The interdisciplinary research team (general practitioners, neurologist, specialist in rehabilitation, anaesthesiologist, neurologist, radiologist, physiotherapist) had several meetings to define a well-built clinical question and translating it into the following relevant and accurate inclusion and exclusion criteria using the PICO framework (www.cebm.net). The acronym 'PICO' stands for patient or problem being addressed (P), the intervention or exposure being considered (I), the comparison intervention or exposure (when relevant) or area of interest (C), and the outcomes of interest (O) [13]. Based upon the PICO relevant and accurate in- and exclusion criteria are constructed. Clinical and KCE experts were consulted for feedback. Besides the in- and exclusion criteria for content of the studies also the design of the studies is important. Included are high-quality systematic reviews, supplemental RCTs, and clinical trials for diagnostic and prognostic studies. Excluded are other study designs, pilot RCT studies or designs including neck and back interventions where data on neck alone cannot be extracted.

2.1.1 Participant

2.1.1.1 Inclusion criteria

- Adults (18 years and over);
- Neck pain in the cervical region, possibly with referred or radiating pain in the occiput, nuchal muscles, shoulders and upper limbs without proven structural disorders in the cervical spine, nerve roots or spinal cord [1].

2.1.1.2 Exclusion criteria

- Children (Age younger than 18);
- Having signs and symptoms of neurological disorders (irradiated pain in the shoulders and /or arms and /or hands (radicular pain/radiculopathy), cervicobrachialgia, myelopathy, …);
- Headache as a consequence of specific headache diagnosis (migraine, cervical headache, …);
- Having a history of specific signs of malignancy, infection;
- Having a history of trauma with or without proven structural disorders in the region of the neck, shoulder and head (e.g. whiplash);
- Having signs and symptoms of cerebrovascular insufficiency (e.g., dizziness, drop attacks, cerebrovascular accident and Transient Ischemic Attack);
- Having a severe chronic disease of the locomotor system (e.g. polyarthritis, muscular disease);
- Having clinical features that indicate an increased risk of specific conditions that can present with neck pain and require urgent attention e.g. described in 'Red flags' (http://www.cks.nhs.uk/neck_pain_non_specific).

2.1.2 Intervention

"Diagnostic evaluation", "management and treatment" and "prognosis" are considered as an intervention of non-specific neck complaints and pain.

2.1.2.1 Inclusion criteria

Diagnostic and/or prognostic evaluation

- Medical history taking
- Symptoms and signs
- Physical examination and assessment
- Diagnostic reasoning
- Psychological assessment
- Imaging
- Diagnostic injections
- Other tests

Management and treatment

- Information or education programs
- Ergonomic interventions both in private and work situation
- Non-medicinal treatment: psychotherapy, manipulations, mobilisation, orthosis (pillows, collar, oral splint) exercise, laser, acupuncture, …
- Medicinal treatments: various (invasive and non-invasive) forms of administration
- Complex interventions (e.g. psychological treatment and exercise program, multidisciplinary approaches)
- Surgery

2.1.2.2 Exclusion criteria

No exclusion criteria for intervention were applied.

2.1.3 Comparison

Comparators are either the natural progress of symptoms or alternative diagnostic tests, management and treatment procedures. Inclusion criteria were the followings:

- Diagnostic evaluation versus other diagnostic evaluation
- Management and treatment versus other management and treatment
- Diagnostic evaluation and/or management and treatment versus no intervention, no treatment

2.1.4 Outcome

2.1.4.1 Inclusion criteria

This study should give up to date information about:

- Diagnostic accuracy of procedures (i.e. false positive, rate, sensitivity, specificity, ROC); history taking, clinical examination, diagnostic tests and procedures

This study should also give up to date information on outcomes of treatments, namely about:

- Side effects, adverse events of treatments
- Evolution (improvement or not) in: the degree of pain, functional capacity, quality of life (only if standardized and validated outcome measures have been used), activity, return to work, work disability, disability measures, global perceived effect.

Definitions of short- and long-term outcomes vary between the studies. The Cochrane back group suggests durations of short term follow-up: between one day and three months, intermediate-term follow up: between three months and one year and long-term follow-up: one year and beyond [14], but individual studies use their own specific criteria.

2.1.4.2 Exclusion criteria

Studies using patient satisfaction data are excluded if no validated and reliable instrument for assessment of pain/disability by the patient was used for data collection.

2.2 LOCATING STUDIES

The PICO framework as described in section 2.1, has been applied to screen the literature. PubMed/ Medline, Embase, Cochrane and Pedro were used to identify publications concerning diagnosis, prognosis and therapy for non-specific neck pain. The search strategies are detailed in appendix 1.

For a reproducible and relevant search, the medical subject heading (MeSH) used was "Neck Pain": "discomfort or more intense forms of pain that are localized to the cervical region. This term generally refers to pain in the posterior or lateral regions of the neck" (http://www.ncbi.nlm.nih.gov/pubmed/).

The electronic search covered the period from 1998 to 2008. We searched for (systematic) reviews, meta-analyses, guidelines, RCT's and clinical trials. For (systematic) reviews, meta-analyses, RCT´s and clinical trials the search engines were PubMed (http://www.ncbi.nlm.nih.gov/pubmed/), Cochrane Database of systematic reviews (http://www.cochrane.org), Embase (http://www.embase.com/) and Pedro search database (http://www.pedro.fhs.usyd.edu.au/redirect.html). For the guidelines the search engines were G.I.N. guideline resource (http://www.g-i-n.net), NEHL guidelines finder (http://www.library.nhs.uk/GuidelineFinder/), National Guideline Clearinghouse (http://www.guideline.gov/), New Zealand Guidelines (http://www.nzgg.org.nz/), NICE-guidelines (http://www.nice.org.uk), SIGN guidelines (http://sign.ac.uk/) and Pedro search database (http://www.pedro.fhs.usyd.edu.au/redirect.html).

A high number of publications (n=1133) were identified during the initial search. Therefore the research team decided to reconsider the inclusion criteria and to screen the (systematic) reviews on full text.

The inclusion criteria became more strictly focussed on non-specific neck pain. Topics as dizziness, temporomandibular, dystonia were excluded. Articles were excluded if they concerned reliability or validity tests of translated assessment instruments. Furthermore publications were excluded if they covered issues of the total spine or the low back and neck, if neck pain was not analysed apart. Finally, pilot studies were also excluded. The results were imported in a reference manager (Endnote X2) and checked for duplicates.

All papers were screened by teams of two reviewers. This process resulted in 564 included publications from which 55 (systematic) reviews. In the following paragraphs a detailed overview of search and screening strategies is reported.

2.2.1 Searches in databases

The first search for "Neck Pain"[MeSH] in PubMed and Embase resulted in 685 hits. The second search was executed in Embase and with the "clinical queries" search engine in PubMed to find (systematic) reviews and also to target clinical study categories including diagnosis, therapy, prognosis and clinical prediction guides. The search has been tested using a narrow search and a broad search approach. The difference in hits was so large (see appendix 1: Literature search strategy) that the team of researchers decided to include the narrow search strategy. This resulted in 373 papers (duplicates excluded). The third search for relevant literature was executed in the Cochrane library and Pedro search engines. It resulted in 75 (systematic) reviews. A total of 1133 potentially relevant citations was finally identified.

Moreover, 40 guidelines were added using in guidelines search engines 'Neck Pain' as keyword.

2.2.2 Screening of titles and abstracts

The 685 publications of the first search were screened on title by two researchers with the PICO in- and exclusion criteria and so 619 papers were left for further screening on title and abstract. With a team of five researchers these 619 papers were screened on title and abstract as well as the 373 publications of the second search and the 75 publications of the third search. Respectively 279, 245 and 40 publications (564 in total) were included.

The screening of the guidelines on title was performed by two researchers. Six met the inclusion criteria (PICO). In a further stage the guidelines were screened with the AGREE instrument (http://www.agreecollaboration.org/instrument/) by two researchers. Only two UK guidelines were included after the quality appraisal (http://www.cks.nhs.uk/neck_pain_non_specific and www.bestpractice.bmj.com).

2.2.3 Screening full text and quality appraisal

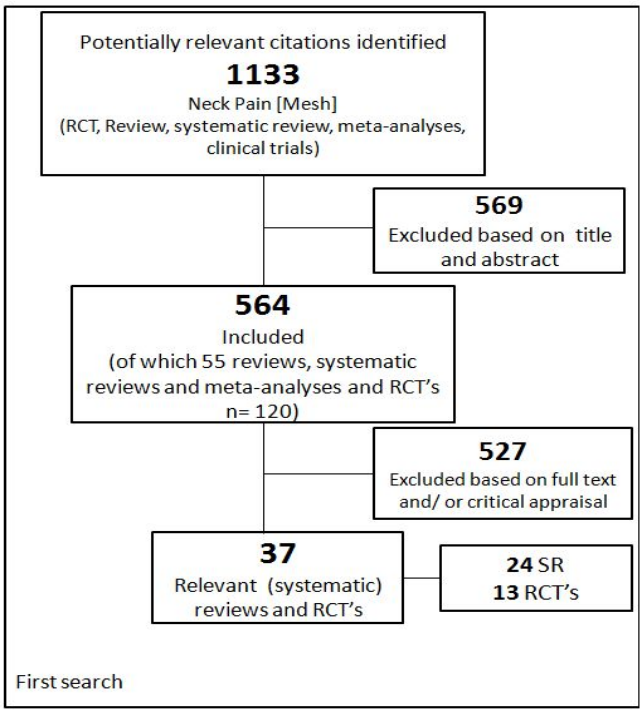
2.2.3.1 Systematic reviews

The (systematic) reviews (n=55) on full text were screened and assessed with the use of the Dutch Cochrane assessment instrument for evaluation of systematic reviews of RCT's. To define the quality of the publication seven reviewers were trained during a workshop and consensus was defined for appreciation of inclusion and exclusion criteria for studies. If systematic reviews did not score positive on the first two items of the instrument (concerning the research question and the search strategy), the (systematic) review was rejected without any further assessment. Fifty five full text publications were reviewed by pairs of reviewers working independently. Two researchers checked the results of this screening. Only 24 publications met the inclusion criteria (PICO and Cochrane score ≥4/8). Reasons for exclusion of the 31 publications were mainly study design (no systematic review, RCT, guideline, case report, technical report, out of scope (WAD, trauma)) or too low score on the Cochrane assessment instrument (<4/8). Excluded publications were saved apart for potential use in a next phase.

2.2.3.2 Randomised controlled trials

From the screening on title and abstract 120 RCT's met the PICO. In the next phase only RCT's published on a later date than the most recent included systematic review were screened on full text and a critical appraisal was performed using the instrument from the Dutch Cochrane Collaboration. Thirteen RCT's met the inclusion criteria and provided complementary or new information in comparison with the systematic reviews.

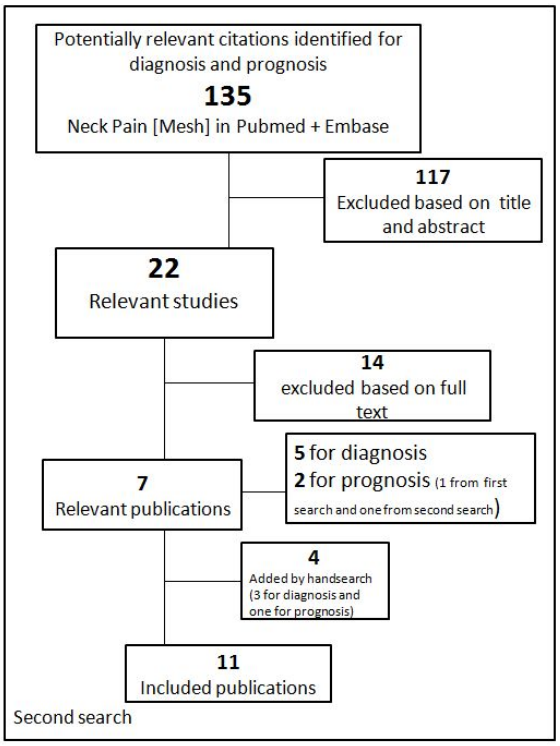
Figure 1: Flow chart: final results of the screening of the literature – first search



2.2.4 New search for diagnosis and prognosis

The database of 55 full text (systematic) reviews was checked for content of diagnosis and prognosis. One systematic review of Borghouts et al was included for prognosis [15]. The search strategy has been further completed for the diagnosis part because of the limited information found after the strategy described above. An adjuvant search was performed in PubMed and Embase using 'neck pain' as a term and "Neck Pain"[Mesh] in clinical queries for diagnosis and with limits: humans, last 10 years, adults and with a narrow search (sensitivity 64%, specificity 98%). This search resulted in 135 possible relevant publications. After screening the articles on diagnosis or prognosis, five publications met the inclusion criteria for diagnosis and two for prognosis (one from the first search and one from the second search). One book has been added i.e., a narrative review advised by experts [16]. Finally, three publications [17-19] for additional information were found by hand search.

Figure 2: Flow chart: final results of the second search for diagnosis and prognosis



2.3 DATA EXTRACTION

Based on the selection described above, two researchers independently extracted the data of the included systematic reviews using prepiloted forms. Data were reported in an evidence table (appendix 2) containing four main themes 'Diagnosis', 'Assessment of pain and disability', 'Prognosis' and 'Treatment'. For the screening of the RCT's and the publications on diagnosis and prognosis on full text, one researcher extracted the data of the included publications (respectively see appendix 3 and appendix 4). Data from the selected guidelines were extracted by one researcher. Finally, the results from these selected guidelines have been compared to the conclusions from the literature search by two researchers.

The results of the data extractions are reported in appendix 5 and chapter 3.4.

The results from the literature are defined per main theme and subtheme in the following paragraphs and where possible the level of evidence in "Grade" is given, [20, 21].

- "Grade A", highest level of evidence: RCTs without important limitations or overwhelming evidence from observational studies;
- "Grade B", moderate level of evidence: RCTs with important limitations (inconsistent results, methodological flaws, indirect, or imprecise) or exceptionally strong evidence from observational studies;
- "Grade C", lowest level of evidence: studies with lower level of evidence than above.

3 RESULTS

3.1 NUMBER OF PUBLICATIONS INCLUDED

The initial search strategy identified 564 publications. The refined search yielded 55 systematic reviews and 53 RCT's, of which 23 (systematic) reviews for treatment and one SR for prognosis met the inclusion criteria; and 13 RCT's met the inclusion criteria for treatment. With a second search for primary articles on diagnosis or prognosis seven publications met the inclusion criteria. Four additional publications, which met the inclusion criteria, were found by hand search. The evidence tables in appendix provide details of the included systematic reviews (appendix 2), RCT's for treatment (appendix 3) and papers on diagnosis (appendix 4).

At the end of the research process and before publication, the KCE standards require that a draft of the report is submitted to 3 independent experts-in-the-field, for peer-review and validation. For this report, the validation experts suggested 4 other papers with updated information not retrieved by the systematic search; 2 of them were systematic reviews published after the date of the literature search. One systematic review published on a specific topic included a mixed patient population but provided also specific results for neck pain [22]. These recommended publications were added in this review.

3.2 DIAGNOSIS

Key messages regarding diagnosis

- **No systematic review or primary study was identified which examined the diagnostic accuracy of history-taking or diagnostic imaging in patients with neck pain. During the diagnostic procedures it is important to exclude the "red flags" (see 1.2, table 1), and nerve-root pain (radicular pain/radiculopathy) and to confirm the diagnosis "Non-specific Neck Pain".**
- **Presence of radicular pain/radiculopathy can be demonstrated by the Spurling's test, traction/neck distraction, shoulder abduction test and a Valsalva's manoeuvre. (Grade C)**
- **To exclude radicular pain/radiculopathy, a (negative) upper limb tension test (ULTT) can be used. (Grade C)**
- **Local anesthetic block is useful in diagnosing facet joint spinal pain, when the clinical diagnosis remains uncertain. (Grade C)**

Evidence from the literature

Four publications [16, 23-25] investigated procedures to diagnose non-specific neck pain. No systematic review or primary study was identified which examined the diagnostic accuracy of history-taking or diagnostic imaging in patients with neck pain.

In the next paragraph, provocative tests for clinical diagnostic procedures will be discussed.

EXCLUSION OF SPINAL OR NERVE-ROOT PATHOLOGY

In order to make the diagnosis of 'Non-specific Neck pain', serious spinal pathology or nerve-root pain has to be excluded [24]. In the review of Rubinstein 2008 [24], a search was conducted to identify systematic reviews and primary studies on diagnostic procedures for the neck. This search did not identify any systematic reviews which examined the diagnostic accuracy of history-taking in patients with neck pain. For diagnostic imaging, systematic reviews were not identified for non-specific neck pain. One systematic review was selected [23]: the authors conducted a comprehensive search to identify studies about provocative tests of the neck for diagnosing cervical radicular pain/radiculopathy. From this study, Spurling's test (Table 2) demonstrated low to moderate sensitivity and high specificity, as did traction/neck distraction (Table 2) and Valsalva's manoeuvre (Table 2). The upper limb tension test (ULLT, Table 2) demonstrated high sensitivity and low specificity, while the shoulder abduction test demonstrated low to moderate sensitivity and moderate to high specificity. So a positive Spurling's test, traction/neck distraction, shoulder abduction test (Table 2) and Valsalva's manoeuvre might be indicative of a cervical radicular pain/radiculopathy, while a negative ULTT might be used to rule it out [23]. Because of the heterogeneity between studies, the paucity of primary studies and several methodological problems, there is only weak evidence about the usefulness of these tests[23] (Grade C). These findings are confirmed in the narrative review by Van Zundert et al (2009) [16].

DIAGNOSIS OF FACET JOINT PAIN

Neck pain originating from (degenerative) facet joints potentially requires specific treatment (e.g. surgical treatment for an advanced stage) and therefore careful diagnosis is warranted. Clinical examination such as tenderness over the facet joints, the radiation pattern,... can give a working diagnosis of facet pain. Single local anaesthetic blocks of the medial branch of the cervical dorsal ramus may be useful in confirming the working diagnosis [16]. For diagnosing chronic spinal pain of facet joint origin, controlled comparative local anaesthetic blocks of facet joints are reproducible, reasonably accurate and safe. The sensitivity, specificity, false-positive rates, and predictive values of these diagnostic tests for neck pain have been determined in multiple studies [16, 25] but the systematic review of Rubinstein (2007) mentions a false positive rate of 27 to 63%. Moreover, no consensus was found about the definition of "a successful anaesthetic block" for cervical facet joints pain. In conclusion, this invasive technique should only be used in case of uncertainty about the clinical diagnosis [16]. (Grade C). This conclusion is supported in the systematic review of Nordin et al [26] added by the validation experts.

The Nordin review also comments on the usefulness of discography. This specific radiological technique uses provocative cervical discography injections to determine if the injection reproduces a neck-patient's usual symptoms, so that primary discogenic pain can be diagnosed and eventually treated. However, since a high proportion of asymptomatic healthy controls also reported a painful response after the injection, the authors conclude that currently discography can not be supported as a diagnostic instrument in neck pain and that it is even not clear whether its underlying premise is valid in these circumstances.

Table 2: Clinical tests for the diagnosis of cervical radicular pain/radiculopathy [16] en [27]

Clinical tests	Description
Spurling's Test or neck compression test [16]	The cervical spine is turned to the painful shoulder and then an axial compression is performed. Reproduction of pain in the shoulder or arm might suggest a nerve compression.
Shoulder abduction test or shoulder abduction relief sign) [16]	The patient elevates his hand above his head. When radicular pain decreases or disappears the test is positive.
Axial manual traction test [16]	Traction on the neck is performed while patient is lying on his back. The traction is around 10 to 15kg. If the radicular pain decreases or disappears the test is positive.
Upper limb tension test (ULTT) [27]	The manoeuvre is performed to mechanically stress the cervical nerve roots and upper limb nerves to test their involvement in suspected radicular pain/radiculopathy. The plexus brachialis can be tested in general, but also the median, radial and ulnar nerve can be tested separately.

3.3 ASSESSMENT OF PAIN AND DISABILITY

Key messages regarding pain and disability assessment

- **To assess self-rated disability of patients with neck pain: the "Neck Disability index" is the most strongly validated instrument for self-rated disability.**

Evidence from the literature

Four publications [17, 18, 28, 29] investigated pain and disability assessment (including questionnaires) in non-specific neck pain.

A small study [29] including 18 neck patients and 22 asymptomatic controls aimed at examining the diagnostic value of pain assessment using a Visual Analogue Scale (VAS), a short form history using the Bournemouth Questionnaire (BQ) and a selection of tests, both manual and instrumental. The VAS and BQ resulted in a high percentage of correctly identified patients and controls (≥77,5%) and a high specificity (90,9%) [29].

The manual examination procedures (MEPs) included a manual examination of both rotations on the C0-2 – C6-7 levels, the adapted Spurling test was performed, starting at the C1-2 proceeding downwards to C6-7 levels performed bilaterally. The percentages of correct identifications based on the manual rotation and adapted Spurling were high (82,5%) as their sensitivity and specificity (respectively 72,2 and 90,9 %). Using CROM (Professional Medical Technologies, inc., 702, North McRoll road, McCallen, TX 78504, USA) for the instrumental mobility examination all identification percentages were around 50%, indicating a lesser diagnostic value. The combination of the VAS, BQ and MEPs resulted in a sensitivity and specificity of 100% and 86,4%, respectively [29]. (Grade C).

In a group of unskilled women (20-45 yrs) performing monotonous work, Björksten et al [28] evaluated a questionnaire (a modification of the Nordic Questionnaire) on musculoskeletal pain and conditions by means of clinical assessment. Sensitivity of the Questionnaire for neck pain during the last 3 months and 7 days was high (100% resp. 92%), but the specificity was low (41 resp. 62%) [28]. (Grade B)

The "Neck Disability Index" (NDI) is the most widely used and most strongly validated instrument for assessing self-rated disability in patients with neck pain. It has been used effectively in both clinical and research settings in the treatment of this very common problem [17, 18]. (Grade A). This is confirmed in a recent review provided by the validation experts [30].

3.4 PROGNOSIS

Key messages regarding prognosis

- **There is a limited number of publications regarding prognostic factors for non-specific neck pain. A few indicators of a less favourable prognosis of neck pain were identified, of which older age and concomitant low back pain were the most consistent. (Grade C) Also there are indications that pathologic radiological findings are not associated with a less favourable prognosis. However, the severity of pain and a history of previous attacks seem to be associated with worse prognosis. (Grade C)**

Evidence from the literature

One (systematic) review and two prospective cohort studies were found considering prognostic factors for non-specific neck pain [15, 19, 31]. There is limited evidence regarding prognostic factors related to the course of non-specific neck pain. For the few studies reporting on prognostic factors the main shortcomings are the sample size and the lack of appropriate analyses techniques. Bearing these limitations in mind there are some indications that there is no association between localization (e.g. radiation to the arms) and worse outcome. Furthermore there are some indications that there is no association between pathologic radiological findings (e.g. degenerative changes in discs or joints) and less favourable prognosis (more pain, lower level of functionality or less general improvement, more utilization of health care, more lost days of work) [15]. The severity of pain and a history of previous attacks however seem to be associated with a worse prognosis [15]. Further, 3 of the studies included in the systematic review report on age as a prognostic factor in only one of them age proves to be a prognostic factor.(Grade C)

In the primary study of Hoving et al [19] the prognostic models showed differences between short- and long-term indicators. At the short-term, besides the baseline values of the respective outcome measurements, only older age (≥40) and concomitant low back pain and headache were associated with poor outcome. At the long term, in addition to age, concomitant low back pain, previous trauma, a long duration of neck pain, stable neck pain during 2 weeks prior to baseline measurement and previous neck pain predicted poor prognosis. So only a few indicators of a less favourable prognosis of neck pain were identified, e.g. older age and concomitant low back pain as the most consistent ones [19].

In the primary study of Vos et al [31] a modified version of the instrument "The Acute Low Back Pain Screening Questionnaire" (ALBPSQ) was investigated for its use in patients with acute neck pain in general practice [31], to predict prolonged sick leave. However, Receiver Operating Characteristic (ROC) curves were regarded as doubtful (0.66 (95%CI 0.56-0.76) (Grade C)

3.5 TREATMENT

This chapter has been divided into six main parts i.e., manual therapy, electrotherapy and other physical medicine modalities, multimodal interventions, multidisciplinary treatment, medication and other methods. To clarify the definition of the treatment modalities as found in the included literature, each of them has been described and if necessary renamed.

3.5.1 Manual therapy

Manual therapy involves the evaluation of a disorder and, on the basis of this evaluation, prescribing an intervention for the disorder rather than administrating treatment based simply on signs and symptoms [32]. In this report manual therapy involves 'target joint motion therapy', 'soft tissue therapy' and 'exercises'.

3.5.1.1 *Target joint motion therapies*

Target joint therapy involves targeted joint motion which includes manipulation, mobilisation and traction. *Manipulation* is used to reduce pain and improve range of motion. Manipulation involves a high-velocity thrust that is exerted through either a long or short lever-arm [33]. *Mobilisation* of the cervical spine involves low-velocity (no thrust) passive motion. Manual and mechanical *traction* is a technique applied with a tractive force to the neck to separate two joint partners [34, 35].

Key messages regarding treatment with target joint therapy

- **Drawing conclusions based on the available evidence is difficult: treatment modalities are not always precisely described and the participants are not always patients with non-specific neck pain (sometimes inclusion of participants with WAD grade I and II). Taking these remarks into account, results show that the effectiveness of manipulation or mobilization alone for acute or chronic non-specific neck pain remains inconclusive (Grade B). Manipulation and/or mobilization within a multimodal approach with exercises however appears effective for chronic non-specific neck pain for pain as well as for function in the short- and long-term follow up (Grade A). The existing evidence on cervical traction is limited and the evidence of possible benefit remains unclear.**

Evidence from the literature

Ten systematic reviews [19, 35-44] analysed manipulation or mobilization as a possible non-invasive intervention. In the systematic review of Kay et al, manipulation and mobilisation combined with exercises are studied within a multimodal approach [44]. Only one systematic review assessed whether traction, either alone or in combination with other treatments, improves pain, function/disability and global perceived effect for mechanical neck disorders [35]. In the publication of Gross [45] the intermittent traction is discussed as one possible conservative treatment. One additional RCT was found on effects of two different types of manipulation [46].

- The effectiveness of manipulation or mobilisation for non-specific neck pain remains inconclusive [40]. Manipulation or mobilisation alone seems not beneficial [19, 37, 38](Grade B). However Vernon [41] reports that a small number of trials have demonstrated a superior effect of manipulation or mobilisation versus the comparison treatment in chronic neck pain. But the same publication also concludes that the majority of studies have not shown any effect of manipulation or mobilisation [41]. More specific in the systematic analysis of group change scores in randomized clinical trials of chronic neck pain not due to whiplash and not including headache, Vernon concludes, based upon 8 of 9 included trials, that "a course of spinal manipulation or mobilisation shows significantly or clinically important changes in the group receiving manipulation" [41]. For acute neck pain treated with spinal manipulation, Vernon reports limited evidence of immediate benefit, but this conclusion is only based upon two RCT's of low quality [43] (Grade C).

- The comparison of different treatment modalities provided as single interventions (i.e. manipulation or mobilization or exercises or massage or physical modalities) does not provide evidence for differences in pain or disability outcomes [19, 38, 39] (Grade C). The study of Cleland [46] (60 participants) suggests that thoracic spine thrust mobilisation/manipulation results in significantly greater short-term (4 days) reductions in pain and disability than does thoracic non thrust mobilisation/manipulation in people with neck pain (Grade C). This is not in line with the results above on comparative effectiveness of manipulation or mobilization. However, treatment modalities are not always precisely described across studies, and might therefore differ from those described by Cleland. The review of Gemmell et al [36] addresses specifically the usefulness of the 'Activator instrument' as compared to manipulation or mobilization, but insufficient evidence is available to draw conclusions.
- Manual therapy (involving mobilization, manipulation) combined with exercises (supervised) seems effective particularly in the treatment of patients with chronic non-specific neck pain, for pain as well as for function in the short- and longterm follow up [19, 38-40, 44, 45] (Grade A). But for manipulation and mobilization combined with other modalities as advice or home exercises no pain relief or improvement in function in mechanical neck disorders is found [38, 45] (Grade C).
- Although rare, associated negative effects of manipulation can be headache, radicular pain, thoracic pain, increased neck pain, distal paresthesia, dizziness, and ear symptoms [19]
- The studies of Graham [35] and Gross [45] support intermittent traction in comparison with control or placebo. However both systematic reviews referenced the same trials of low quality (Zybergold, 1985 and Goldie 1970). (Grade C)

3.5.1.2 Soft tissue therapies

Soft tissue therapy involves massage. *Massage* is a manipulation of the soft tissues of the human body with the hand, foot, arm, elbow on the structures of the neck [47]. Techniques include fascial techniques, cross fiber friction, non-invasive myofascial trigger point techniques and shiatsu massage.

Key messages regarding treatment with soft tissue therapies

- **Massage was never described in sufficient detail to know for sure how it was performed. The limitations of existing studies prevent from drawing any firm conclusion on the effectiveness of massage therapy for non specific neck pain. The evidence on possible beneficial effects of specific massage techniques remain unclear (Grade C).**

Evidence from the literature

Four systematic reviews assessed the effect of massage on pain and function [41, 45, 47, 48] and two of them [47, 48] had similar conclusions. All reviews identified major methodological weaknesses e.g. often a lack of uniform definition of the technique and dosage. Therefore no general conclusion can be made that supports massage as treatment for non-specific neck pain.

- Limited evidence was identified that traditional Chinese massage may be beneficial for short-term pain management (but not for function) [45]. (Grade C)
- It is suggested that various other massage techniques do not reduce pain [45, 47] (Grade C). Massage alone was not identified as effective treatment (Grade B). Massage versus exercise showed no significant difference between the groups for pain at short-term follow-up [47] (Grade C).

- It was impossible to identify the effect of the contribution of massage within a multimodal approach [41, 47, 48]. (Grade C). No significant difference was found between massage plus sham laser and manipulation at short-term follow-up [47].

3.5.1.3 *Exercise*

Exercises involves bodily activities related to the neck region. These can be shoulder exercises, active exercises, stretching, strengthening, postural, functional, eye-fixation and proprioceptive exercises for the treatment of non-specific neck pain [44].

Key messages regarding treatment with exercises

- **There is evidence that exercise (under supervision) can be effective for the treatment of non-specific chronic neck pain to diminish pain and improve function in the short-term as well as in the long-term. (Grade B). Strengthening, stretching, proprioceptive (eye-fixation) and dynamic resisted exercises are treatments that can be effective (Grade B). Home exercises (not supervised), group exercises and neck school (for a heterogeneous group) are not supported by evidence (Grade C) .**

Evidence from the literature

Two systematic reviews were found on this topic [44, 49]: both included non-specific neck pain as well as whiplash associated disorders grade I and II with the same complaints as non-specific neck pain patients. Two other systematic reviews dealt with various techniques among which also exercises [38, 45]: one of them explicitly described non-specific neck pain excluding whiplash associated disorders [38]. Four additional recent RCT's describe neck muscle training [50-53].

- For stretching and strengthening programs focussing on the cervical or cervical and shoulder/thoracic region, there is moderate evidence of short- and long-term benefit on pain and function in chronic mechanical neck disorders [44, 45] (Grade B). Strengthening and stretching of only the shoulder region plus general condition did not alter pain in the short or long term, but did assist in improving function in the short term for chronic mechanical disorders [45] (Grade C). In a study of females with chronic neck pain both endurance exercises and strength training decreased 12-month pain and disability outcomes more than did an exercise advice control group [38, 51]. (Grade C). Recent studies concluded to the effectiveness of manual therapy and stretching on neck muscle strength and mobility in chronic neck pain. Neck muscle strength improved slightly during the first 4 weeks in the manual therapy and stretching groups. There was no further improvement. These treatments alone are not effective in neck muscle strengthening [53] (Grade C). The same group of researchers studied strength training and stretching versus stretching only. Stretching only was probably as effective as combined strength training and stretching [52].
- Eye-fixation and neck proprioceptive exercises were found to be effective for pain relief and function and general perceived effect (GPE) in the short term and in the long term only for GPE for cases of chronic mechanical disorders [44, 45, 49]. (Grade B)
- There is conflicting evidence about the effect of home exercises (exercises not supervised on a continued basis) on neck pain for pain and function [38, 44, 45, 52]. Also group exercises, neck school (for heterogeneous groups of patients with different kinds of neck pain) or single session of extension-retraction exercises cannot be supported by evidence [49]. (Grade C)

- There is strong evidence of benefit for pain and function favoring a multimodal care approach of exercises (supervised) combined with mobilizations or manipulations for sub-acute and chronic mechanical neck disorders in the short and long term [38, 44]. (Grade A)
- The decrease in pain and disability was found to be maintained at the three year follow-up after a neck muscle training [51]. The indices in this RCT showed no statistically discernible change compared to the situation at the 12-month follow-up. Also, gains in neck strength, ROM and pressure pain threshold achieved during the training year were largely maintained [51]. (Grade C)
- Some support has been found for the prescription of therapeutic exercises as an immediate pain-relieving strategy. Results of one RCT suggest that specific cranio-cervical flexion-exercises can be prescribed with the intention of providing an effective pain relieving modality potentially as a substitute for, or as conjunct therapy to, other self-applied pain relieving modalities such as medication or heat [50]. (Grade C)

3.5.2 Electrotherapy and other physical medicine modalities

Electrotherapy modalities include galvanic or diadynamic currents, iontophoresis, transcutaneous electrical nerve stimulation (TENS), electrical muscle stimulation, pulsed electromagnetic field (PEMF), repetitive magnetic stimulation or permanent magnets. However, electro-acupuncture is not included here (http://www.electrotherapy.org/modalities.htm).

Other physical modalities included in this review are low-level laser therapy (LLLT), other types of laser therapy, ultrasound and thermal agents (e.g. hot packs).

Key messages regarding treatment with physical medicine modalities

- **Conclusions on physical medicine modalities are difficult given the range of interventions and the limited and conflicting evidence (Grade C).**
- **For electrotherapy, there is inconsistent evidence that transcutaneous electrical nerve stimulation (TENS) would be beneficial in the treatment of chronic neck pain. For electrical muscle stimulation or other electrotherapies such as galvanic current, diadynamic currents or iontophoresis, there is limited evidence of no benefit on pain at short term (Grade C).**
- **For electromagnetic therapy (pulsed electromagnetic field therapy (PEMF), repetitive magnetic stimulation) limited evidence is found for beneficial effects. Repetitive magnetic stimulation is beneficial for pain and function in the short term in chronic neck pain; for PEMF this is true for pain immediately post treatment in acute and chronic neck pain (Grade C).**
- **Limited evidence supports the benefit of low-level laser therapy (LLLT) with infrared wavelengths (Grade C). LLLT appears to relief pain and have positive functional changes for acute and chronic neck pain in the short term. For other types of laser therapy no benefit was found for pain treatment in patients with neck pain.**
- **There is limited evidence of no benefit for thermal and ultrasonic agents in the treatment of non-specific neck pain (Grade C).**

Evidence from the literature

Five systematic reviews studied the effect of physical medicine modalities as treatment for mechanical neck disorders [14, 38, 43, 45, 54].

- Notwithstanding the heterogeneity of the studies identified in the review of Chow, low-level laser therapy (LLLT) with infrared wavelengths has some limited evidence for the treatment of acute and chronic neck pain [54]. The reduction in pain levels with LLLT was modest in patients with chronic neck pain and although limited by short term follow up were supported by positive functional changes [45, 54]. Hurwitz concluded that LLLT is more effective than no treatment to improve acute pain and short term function in persons with sub-acute or chronic neck pain [38].
- For repetitive magnetic stimulation there is limited evidence of a beneficial effect in chronic non-specific neck pain on pain and function at short term (Grade C) [38].
- There is limited evidence that extremely low frequency and high frequency PEMF (pulsed electromagnetic field) reduce pain for patients with acute or chronic mechanical disorders immediately post treatment. The effect is not maintained on short term [14, 45] compared with placebo (Grade C).
    - Limited evidence of no benefit for chronic non-specific neck pain on pain in the short term is mentioned for magnetic necklace i.e. a static electromagnetic field (Grade C). [14, 45]
- Inconsistent evidence is found that TENS treatment is beneficial for chronic neck pain [14, 38]. The limited evidence mentioned by Vernon is based on a low quality RCT [43] (Grade C).
- There is limited evidence that for chronic non-specific neck pain, EMS (electrical muscle stimulation) has no detectable effect on pain or function at short or long term follow up[14, 45] Limited evidence of no benefit on pain in the short term is also mentioned for electrotherapies such as galvanic current, diadynamic currents or iontophoresis (Grade C).

The studies of Hurwitz [38] and Gross [45] report limited evidence of no benefit for thermal and ultrasonic agents as an isolated intervention for chronic non-specific neck pain (Grade C). Limited evidence of no benefit on pain in the short term is also mentioned for spray and stretch.

3.5.3 Multimodal interventions

Multimodal treatment is the combination of at least 2 different therapy modalities used for non-specific neck pain, for example exercises combined with mobilisation and medication.

Key messages regarding multimodal interventions

- **There is evidence to support multimodal therapies for patients with non-specific neck pain to reduce pain and improve function in the short and the long term. A multimodal approach should consider exercises (supervised) in combination with passive treatment as mobilisation, manipulation or both and if possible forms of education (Grade A). Also active treatment seems advisable for non-specific neck pain patients. However, there is uncertainty of the precise modalities that provide the effective ingredients.**

Evidence from the literature

Five systematic reviews [19, 37, 38, 44, 45] analysed the effects of a multimodal treatment for mechanical neck disorders. Multimodal approaches including stretching/strengthening exercise and mobilisation/manipulation for sub acute/chronic mechanical neck disorders reduced pain, improved function and resulted in favourable general perceived effect in the long term [45].

- There is strong evidence of benefit favouring a multimodal care approach of exercise (supervised) combined with mobilisations or manipulations for subacute and chronic mechanical neck disorders [37, 38, 44, 45] (Grade A).
- There is moderate evidence that manipulation and/or mobilisation in combination with electrotherapy or medication or other non invasive techniques have shown no difference in benefit for pain relief, improvement in function and global perceived effect [19].

3.5.4 Multidisciplinary treatments

Multidisciplinary approaches, methods or treatments require a team of therapists from different disciplines working on the same patient together or alone without a common discussed purpose [55]. The main difference between multimodal and multidisciplinary is the involved therapists. One therapist can give a multimodal therapy, but one therapist cannot give a multidisciplinary treatment.

Key messages regarding multidisciplinary treatments

- **There is little evidence found to support multidisciplinary approaches. This conclusion is to be considered carefully because little research of good quality has been performed to measure the effect of multidisciplinary approaches for patient with non-specific neck pain (Grade C) .**

Evidence from the literature

Two systematic reviews studied the effect of multidisciplinary approaches for the treatment of patients with neck pain [38, 56].

- A rehabilitation program in a Cochrane review updated in 2008 was considered multidisciplinary if it encompassed a physician's consultation with either a psychological, social or vocational intervention, or a combination of these last interventions [56]. It could not be shown by the two included studies (of low quality) that multidisciplinary rehabilitation was better than usual care for neck and shoulder pain [56].
- One of these two studies was also included by Hurwitz (2008). Patients with neck pain who took part in a multidisciplinary rehabilitation program had comparable sick-leave outcomes compared to patients who received other care. But patients in this program experienced improved mobility over two years whereas those receiving other care did not [38].

3.5.5 Medication

Medication for the treatment of non-specific neck pain can be delivered by oral, intravenous, intramuscular, intra-articular, sub-cutaneous or intrathecal routes and classed as analgesics, anaesthetics, non-steroidal anti-inflammatory drugs (NSAIDs), muscle relaxants, opioids, corticosteroids or Botulinum toxin [57].

Key messages regarding medication

- **There are not enough studies on any medicinal treatment for non-specific neck pain to allow strong recommendation for treatment regarding medication. Therefore all the following key messages should be completed with key messages on pain therapy as found in general guidelines (American Geriatrics Society (http://www.americangeriatrics.org/), Sociéte Scientifique de Médecine Générale (http://www.ssmg.be)).**
- **Local anaesthetic injection with lidocain into myofascial trigger points appears beneficial for chronic non-specific neck pain, but it is no more effective than other less invasive techniques such as ultrasound or laser (Grade C) .**
- **There is moderate evidence for the benefits of non-narcotic analgesics including NSAIDs, because of their effectiveness on pain compared to placebo but unclear benefits compared to other treatments (Grade C).**
- **Other treatments such as Botulinum toxin A (Grade B) injections or subcutaneous carbon dioxide insufflations (Grade C) have no better effect than placebo and so have no indication for non-specific neck pain.**
- **There is unclear evidence about the benefit of psychotropic agents used as muscle relaxants (Grade C).**

Evidence from the literature

One systematic review was found on the use of medication as an intervention [57] and two which include this topic among other treatments [38, 45]. Two other recent RCT's were found, dealing with the effectiveness of medication treatment for non specific neck pain [58, 59]. The experts added a recent systematic review during the validation meeting [22].

- Local anaesthetics (lidocaine injections into myofascial trigger points) appear effective in reducing chronic neck pain when compared to dry needling or treatment as usual (stretching, exercises…). [57] However, it is no more effective than other less invasive treatments such as laser and ultrasound[22] (Grade C);
- There is moderate evidence showing that, on average, Botulinum toxin A is no better than saline injections at lessening pain and disability for chronic mechanical neck disorders [38, 45, 57] (Grade B). There is also low evidence that subcutaneous carbon dioxide insufflations are no better than sham ultrasound for treating acute non specific neck pain [58]. (Grade C);
- There is unclear evidence of benefit for oral psychotropic agents (such as diazepam, tetrazepam) used as muscle relaxants [38, 45 57] (Grade C);
- There is unclear evidence of benefit for nerve block injections [38, 45 57]. (Grade C)
- In subacute and chronic neck disorders, there is unclear evidence of benefit for oral non-narcotic analgesics including anti-inflammatory agents (NSAIDs) [57]: NSAIDS (such as ibuprofen, oxicams) combined with education or manipulation show no significant differences on pain compared with manipulation/physical therapy [57]. Placebo controlled studies (moderate or low quality), show benefits of paracetamol, (opioid) analgesics or NSAIDs on pain. However, there is no clear difference when analgesics and/or NSAIDs are compared with each other. (Grade C)

- One RCT of good quality on 116 patients with chronic neck pain over more than 6 months and with acute attacks compared oxycodone to placebo. The conclusion is that oxycodone could be used for chronic neck patients with frequent acute episodes of neck pain. However side effects were present during the first days and the follow-up was of limited duration [59] (Grade C).

3.5.6 Other methods

Other methods involve giving advice, education programs, using special pillows, collars and acupuncture as treatment.

For surgical treatment in non-specific neck pain, no publications were retrieved in the search of this review; it will shortly be included here also.

3.5.6.1 Surgery

No publications were retrieved in the current search for surgical treatment. This was confirmed in a systematic review provided by the validation experts[60]. It can be concluded that at this time there is no acceptable clinical evidence supporting surgical procedures such as anterior or posterior cervical fusion or cervical arthroplasty for neck pain with common degenerative changes only, when there is no radiculopathy, demonstrable instability or serious deformity.

3.5.6.2 Education

Education programs and giving advice are methods which intend to influence the learning experience [61], illness beliefs and behaviour of the patient with non-specific neck pain.

Key messages regarding patient education programs

- **There is evidence of no benefit for education programs as treatment for non-specific neck pain- when compared to no treatment or to other treatments.**
- **A group-based work style intervention or ergonomic counselling in computer workers seemed to be effective.**
- **More evidence and of higher level is necessary to conclude education programs generally are beneficial or not. (Grade B)**

Evidence from the literature

In three systematic reviews 'education' is tested as treatment modality [38, 45, 61]. Two RCTs studied the effectiveness of a group-based interactive work style intervention and ergonomic counselling in computer workers [62 63].

- Various educational programs were studied. They were delivered to the patients orally, under a written or audiovisual form [38, 45, 61]. There is evidence of no short- or long term benefit for pain or function with educational programs focusing on activation or on stress coping skills when compared to no treatment or other treatments (manual therapy, behavioural cognitive skills, massage, etc). (Grade B)
- For traditional neck schools also no benefit was found, when compared to no treatment [38, 45, 61].(Grade C)
- For specific groups, such as (female) computer workers, there is moderate evidence for the effectiveness of education or counselling programmes (Grade B). After ergonomic counselling alone or combined with ambulant myofeedback in female computer workers, pain intensity and disability significantly decreased on short and medium term [63]. A group-based work style intervention in a similar group of patients, resulted in a different work style behaviour such as a more frequent use of breaks [62].

3.5.6.3 *Pillows*

Key messages regarding pillows

- **Pillows used in a multimodal approach in combination with exercises have shown positive results in reducing neck pain. (Grade C) There is not enough evidence for the use of pillows as isolated treatment for patients with chronic neck pain.**

Evidence from the literature

Only one systematic review is found on this topic [64] and one other systematic review mentions pillows within various techniques [45]. One RCT studied the effect of sleeping neck support combined or not with exercise [65]. The combination of exercise with a neck pillow showed a significant effect. Although some studies showed positive effects on pain reduction, there is not enough evidence for the use of pillows alone to reduce chronic neck pain. (Grade C)

3.5.6.4 *Soft collars*

From one systematic review there is moderate evidence of no benefit for the use soft collars for patient with non-specific neck pain [45]. (Grade B)

3.5.6.5 *Oral splint*

One systematic review studied the effect of oral splints and found moderate evidence of no benefit [45] (Grade B) .

3.5.6.6 *Acupuncture*

Acupuncture is the insertion of needles into the body to reduce pain or induce anaesthesia. There are a number of different approaches that incorporate medical traditions from China, Japan, Korea, and other countries. The most thoroughly studied mechanism of stimulation of acupuncture points employs penetration of the skin by thin, solid, metallic needles, which are manipulated manually or by electrical stimulation [66].

Key messages regarding acupuncture

- **Based on the literature there is moderate evidence that acupuncture, and more specifically trigger point acupuncture can improve pain relief for non-specific chronic neck pain in the short term only without any significant change in function. (Grade B)**

Evidence from the literature

One systematic review [67] analysed the effect of acupuncture and one systematic review [45] on conservative treatments and acupuncture was also included. Three additional recent RCT's on the effects of acupuncture, including its cost-effectiveness , were also included [68-70]

- There is strong to moderate evidence that acupuncture is effective for pain relief compared to inactive treatments either immediately post-treatment or in short - and intermediate follow-up for chronic mechanical neck disorders [45, 67, 69]. (Grade A) A recent cost-effectiveness study among 3451 patients with chronic neck pain, showed that treating patients with acupuncture resulted in a marked clinical relevant benefit and was relatively cost-effective in Japan, Spain and Germany (€ 12.469 per QALY gained) [70].
- There is heterogeneity in acupuncture interventions (trigger point acupuncture, classical, and others). Trigger point acupuncture seems more effective than some other types of acupuncture for pain relief, measured at the end of the treatment and at short-term follow-up [68]. (Grade C)

3.6 CLINICAL QUESTIONS ON NON-SPECIFIC NECK PAIN: SUMMARY OF THE LITERATURE FINDINGS

This last chapter translates the results from the literature review into clinical questions. The conclusions from this literature search have been compared to the recommendations from the selected high quality guidelines http://cks.library.nhs.uk/neck_pain_non_specific and www.bestpractice.bmj.com. A table with the clinical questions that summarize the literature results, and the comparison of these questions to the recommendations in the selected guidelines, can be found in appendix 5. Overall, the conclusions from this literature search are consistent with the selected (inter)national guidelines.

For a quick overview of evidence-based treatment of neck pain including non-specific neck pain as well as neck disorders with radicular signs or associated with WAD, the interested reader is referred to a reference published after closure of the database search for this report. This reference was provided by the validators (Gross et al., 2009).[71]

The 3 main clinical questions for diagnosis for non-specific neck pain are:

1. How to assess someone with neck pain?
   - Firstly, exclude "red flags", serious spinal pathology, radicular pain/radiculopathy;
   - Secondly, consider the possible prognostic factors:
     - Old age and concomitant low back pain seem to be indicators of a less favourable prognosis of neck pain (Grade C);
     - Pathologic radiological findings (e.g. degenerative changes in disc or joint) are not associated with worse prognosis, but the severity of pain and a history of previous attacks seem to be associated with a worse prognosis. (Grade C);
2. What are the diagnostic procedures to be performed to diagnose non-specific neck pain?
   - No literature addressing the diagnostic accuracy of history taking has been found;
   - No literature addressing the diagnostic accuracy for imaging in patients with non-specific neck pain has been found;
   - Confirm or exclude 'radicular pain/radiculopathy' with the combination of the following tests:
     - Tests to confirm radicular pain/radiculopathy (Grade C):
       - Positive Spurling Test
       - Positive Traction Distraction test
       - Positive Valsalva manoeuvre
       - Positive Shoulder Abduction test
     - Tests to exclude radicular pain/radiculopathy (Grade C): Negative Upper Limb Tension test.
   - Diagnose facet joint spinal pain :
     - Local anesthetic block can be used for proving or excluding facet joint spinal pain if a diagnosis by manual examination procedures fails and/or if the diagnosis remains uncertain in patients with chronic non-specific neck pain (Grade C)
3. How to assess pain intensity or disability in patients with non-specific neck pain?
   - For self-rated disability, the “Neck Disability index” is the most validated instrument.

3.6.1 Management of non-specific neck pain

The 13 clinical questions and the answers for non-specific neck pain are:

1. Does manipulation or mobilization alone work for acute or chronic non-specific neck pain?
   - There is moderate evidence that manipulation or mobilization alone have no effect during the acute or chronic phase of non-specific neck pain. (Grade B)
2. Does manipulation or mobilization combined with supervised exercises work for acute or chronic non-specific neck pain?
   - Manual therapy (involving mobilization, manipulation) combined with exercises are effective in the treatment of patients with chronic non-specific neck pain for pain and disability in short- and long term follow up. (Grade A)
   - Manipulation and mobilization combined with other modalities such as advice or home exercises do not relieve pain or decrease disability. (Grade C)
3. Is traction an effective intervention for non-specific neck pain?
   - Traction on the cervical spine may not be effective for treatment of non-specific neck pain. (Grade C)
4. Is massage an effective intervention for non-specific neck pain?
   - No conclusion can be made for massage therapy given the low methodological quality of the studies (Grade C).
5. Are exercises effective for the treatment of non-specific neck pain?
   - Exercises (supervised by a qualified professional) are effective for the treatment of non-specific chronic neck pain for pain and function. (Grade B)
   - Strengthening, stretching, proprioceptive and dynamic resisted exercises are effective for chronic non-specific neck pain. (Grade B)
     - Stretching and strengthening programs focussing on the cervical or cervical and shoulder/thoracic region give short- and long-term benefit on pain and function in chronic mechanical neck disorders. (Grade B)
     - Strengthening and stretching of only the shoulder region plus improving general condition may help in improving function in the short term for chronic non-specific neck pain. (Grade C)
     - Eye-fixation and neck proprioceptive exercises are effective for pain relief and function in the short term for chronic non-specific neck pain. (Grade B)
     - Home exercises (not supervised), group exercises, neck school (for heterogeneous groups of patients) and single session of extension-retraction exercises may not be effective for non-specific neck pain (grade C).
6. Are electrotherapy modalities and other physical medicine treatments effective as an intervention for non-specific neck pain?
   - Low Level laser therapy may be effective for acute and chronic non-specific neck pain to relieve pain and improve function in the short term. For other types of laser therapy there may be no benefit (Grade C);
   - PEMF (pulsed electromagnetic field) may reduce pain immediately post-treatment for patients with acute or chronic non-specific neck pain (Grade C);
   - For repetitive magnetic stimulation, there may be a beneficial effect for chronic non-specific neck pain on pain and function in the short term (Grade C);

- Benefit from TENS (transcutaneous electrical nerve stimulation) treatment for chronic non-specific neck pain is doubtful (Grade C);
- For EMS (electrical muscle stimulation) and other electrotherapies (diadynamic currents, iontophoresis…) in chronic non-specific neck pain, there may be no benefit on pain or function (Grade C);

Thermal and ultrasonic agents as an isolated intervention for chronic non-specific neck pain may not be effective (Grade C).

7. Are multimodal approaches effective for non-specific neck pain?
   - A multimodal approach of exercises (supervised) combined with mobilizations and/or manipulations is effective for sub-acute and chronic non-specific neck pain (Grade A).
8. Is a multidisciplinary approach effective for non-specific neck pain?
   - No recommendation could be made based upon the literature search (Grade C).
9. Does medication work for non-specific neck pain?

There are not enough studies on any medicinal treatment for non-specific neck pain to allow strong recommendation for treatment regarding medication. Therefore all the following recommendations should be completed with key messages on pain therapy as found in general guidelines (American Geriatrics Society (http://www.americangeriatrics.org/), Sociéte Scientifique de Médecine Générale (http://www.ssmg.be)).

- Local anaesthetics (lidocaine injections into myofascial trigger points) may be effective in reducing chronic non-specific neck pain, but it is probably no more effective than other less invasive procedures (Grade C);
- Botulinum toxin A is no better than saline injections for chronic non-specific neck pain (Grade B);
- Subcutaneous carbon dioxide insufflations are no better than sham ultrasound (placebo treatment) for acute non-specific neck pain (Grade C);
- Paracetamol, (opoid) analgetics or NSAIDs on pain are beneficial, but no clear difference is found when analgetics and/or NSAIDs are compared with each other (Grade C).

10. Do education programs work for patients with non-specific neck pain?
    - Educational programs focusing on activation or on stress coping skills are not beneficial for non-specific neck pain (Grade B);
    - Traditional neck schools may not be beneficial for the treatment of non-specific neck pain (Grade C);
    - Education or counselling programmes for (female) computer workers are effective to decrease pain intensity and disability (Grade B).
11. Are pillows effective in the treatment of non-specific neck pain?
    - Neck pillows in combination with exercises seem effective to reduce pain for patients with chronic non-specific neck pain (Grade C).
12. Is the use of collars, oral splints effective for patients with non-specific neck pain?
    - There is no benefit of the use of soft collars or oral splints for patients with non-specific neck pain (Grade B).
13. Does acupuncture have a positive effect on treatment of non-specific neck pain?
    - Acupuncture and more specifically trigger point acupuncture improve pain but not function in the short term for non-specific chronic neck pain (Grade B).

4 DISCUSSION

This study aimed to review the scientific literature on diagnosis, prognosis and treatment of acute and chronic non-specific neck pain. The objective was to propose an evidence-based review on how to diagnose and to treat adults who suffer from non-specific neck pain. Nevertheless all conclusions should be applied with caution due to the actual weaknesses of most studies and should be applied as a guide to clinical decision making. All key messages were compared afterwards with the conclusions of two guidelines of high quality and discussed with a panel of experts.

The following limitations have to be considered for the interpretation of the results of this systematic review:

- First of all the concept "non-specific neck pain" has been described by several authors but it is a rather broad and vague concept [1]. Also the concept of 'diagnosis' in non-specific neck pain is a contradiction as it is based upon the definitions found in the literature: it is a concept which confirms that no identification of cause can be made to explain the 'neck pain'. The focus in the search on non-specific neck pain can have limited finding other possible effective treatment modalities.
- It is possible that an identification of subgroups in the group of non-specific neck pain patients might result in more targeted diagnostic procedures and treatments with a better response rate. Unfortunately, the available literature does not allow any further precision over those possible subgroups, so further research on this subgroups can give more clarity.
- One should remind that many other diagnostic evaluation techniques exist within the broad field of general pain assessment. This search only included studies on non-specific neck pain, but it is possible that some diagnostic instruments for general acute or chronic pain assessment could be useful in non-specific neck pain.
- In this review the treatment modalities were clustered: this classification might not be ideal but gives a good overview of possible treatment modalities.
- It is important to emphasize the heterogeneity and lack of definition of many interventions described in the literature. Many studies lacked a definition of non-specific neck pain and did not describe the treatment modalities in detail.
- Only the multimodal approach of manual therapy and exercises was found to be clearly effective. One could hypothesize that subgroups within the group of non-specific neck pain patients do exist, and that by combining several therapeutic approaches each of which is indicated for a specific subgroup, results are positive for the whole group.
- Only limited evidence exists on pharmaceutical therapy for non-specific neck pain. These limited results are due to our methodology focusing only on non-specific neck pain, and so excluding all trials and (systematic) reviews on pain treatment for musculoskeletal disorders. So the conclusions of this report need to be completed with other evidence or guidelines on pain management.
- No publications on surgical treatment nor on psychotherapy were retrieved in this review. The lack of publications on surgery for non-specific neck pain was confirmed in the systematic review by Carragee et al [60] and at this time there is no acceptable clinical evidence supporting surgical procedures for the indication of neck pain when there is no radiculopathy, demonstrable instability or serious deformity. The lack of publications on psychotherapy might be due to the fact that psychological databases (e.g. PsycINFO) were not included.

This study results in a limited number of statements useful for clinical practice. These conclusions are mostly consistent with (inter)national guidelines: http://www.cks.nhs.uk/neck_pain_non_specific, www.bestpractice.bmj.com, http://www.guideline.gov/summary/summary.aspx?doc_id=8392&nbr=004700&string=cervical
http://www.guideline.gov/summary/summary.aspx?doc_id=8542&nbr=004751&string=cervical

However there is a clear need for more focussed research as for example :

- Research into fine-tuning sub diagnoses, hence moving patients currently identified with non-specific neck pain into a group of patients suffering a more precisely identified pathology, for which a more targeted treatment option may be available;
- Symptoms assessment, using symptom scores, and the added value of clinical near-patient tests;
- Testing specific therapy for subcategories of adult patients with non-specific neck pain, which may respond better to specific therapies;
- Evaluating several treatment modalities (e;g. manual therapy, education programs, neck schools, etc). including a more precise description of the treatment technique used.

5 SUMMARY

The results displayed in chapter 3 were translated into statements. These statements were scored in accordance with the GRADE-system [21, 72], by four Belgian experts: two in the field of physiotherapy, one anaesthesiologist and one general practitioner. In consensus with the research team the statements were graded "strong" or "weak" and also "in favour" or "against" the proposed intervention.

When the desirable effects of an intervention clearly outweighed (or clearly did not outweigh) the undesirable effects, the guideline panel offered strong recommendations according to the GRADE-system [21, 72]. On the other hand, when the proposed methods were less certain - either because of low quality evidence or because evidence suggested that desirable and undesirable effects were closely balanced - weak recommendations were offered according the GRADE-system [21, 72]. Clinicians should keep in mind that in that case, they should carefully consider the benefits, risks, and burdens in the context of the individual patient. How to individualize decision making in weak recommendations remains a challenge [72].

Table 3: Summary: diagnostic procedures, prognosis and treatment modalities in non-specific neck pain (NSNP)

Proposed intervention(s)	Level of evidence A, B, C; best available or no evidence from the literature	"Strong" or "weak" and "in favour" or "against"
Diagnosis and prognosis		
History taking	No evidence from the literature	Strong - In favour
Excluding red flags	Best available evidence from the literature	Strong - In favour
Diagnostic imaging	No evidence from the literature	Weak - Against
The "Neck Disability Index" as instrument for self-rated disability	Level of evidence not applicable Valid instrument	Strong - In favour
Confirm radiculopathy: Spurling's test – traction/neck distraction – Shoulder abduction – Valsalva's manoeuvre	C	Weak - in favour
Rule out radiculopathy: Negative Upper Limb Tension test	C	Weak-In favour
Diagnose facet joint spinal pain: Local anesthetic block when no clinical diagnosis	C	Weak - In favour
Unfavourable prognostic elements: severity of pain; previous attacks; old age or concomitant low back pain	C	Weak - In favour
Pathologic radiological findings (e.g. degenerative changes) are associated with worse prognosis	C	Weak - Against

Treatment of non-specific neck pain (NSNP)		
Chronic NSNP -Multimodal approach: mobilizations/manipulations combined with supervised exercises	Effect on pain/function in short and long term (A)	Strong - In favour
Chronic NSNP -Manipulation / Mobilization combined with other modalities	No effect (C)	Weak – Against
Chronic NSNP -Supervised exercise: stretching and strengthening programs focussing e.g. on the cervical region	Effect on pain/function in the long term (B)	Weak - In favour
Chronic NSNP -Supervised exercise: stretching and strengthening of the shoulder region with exercises improving general condition	Effect on function in the short term (C)	Weak - In favour
Chronic NSNP -Supervised exercise: eye-fixation and proprioceptive exercises	Effect on pain/function in the short term (B)	Weak - In favour
Acute and chronic NSNP -Manipulation / Mobilization alone	No effect (B)	Weak – Against
Chronic NSNP -Traction	No effect (C)	Weak – Against
Acute and chronic NSNP -Massage	No conclusion (C)	Weak – Against
Chronic NSNP –Isolated Home exercises, isolated group exercises, non-multidisciplinary traditional neck schools	No effect (C)	Weak - Against
Acute and chronic NSNP -Low level laser therapy (LLLT); pulsed electromagnetic fields (PEMF)	Effect in the short term on pain/function (LLLT); on pain (PEMF)(C)	Weak - In favour
Chronic NSNP – transcutaneous electrical nerve stimulation (TENS) or electrical muscle stimulation (EMS) on trigger points	No effect (C)	Weak - Against
Chronic NSNP –Multidisciplinary approach	No conclusion (C)	Weak - In favour
Acute and chronic NSNP -Paracetamol, NSAIDs, opioids analgesics	Effect on pain in the short term (C)	Weak - in favour
Chronic NSNP –Local anaesthetic injection with lidocain into myofascial trigger points	Effect on pain in the short term (C)	Weak - in favour
Chronic NSNP –Botulinum toxin A	No effect (B)	Weak - against
Acute NSNP -Subcutaneous carbon dioxide insufflations	No effect (C)	Weak - against
Acute and chronic NSNP -Isolated educational programs	No effect (B)	Weak - against
Chronic NSNP -Pillows in combination with exercises	Effect on pain in the short and long term (C)	Weak - in favour
Chronic NSNP –Acupuncture (e.g. trigger point)	Effect on pain in the short term (B)	Weak - in favour
Chronic NSNP -Use of collar or oral splints	No effect (B)	Weak - against

6 APPENDICES

APPENDIX 1: SEARCH STRATEGY

SEARCH STRATEGY MEDLINE CLINICAL QUERIES AND SYSTEMATIC REVIEWS

Author	
Name	Giannoula Tsakitzidis
Project number	PPF08-24-GCP
Project name	Cervicalgia : Diagnosis and Therapy
Keywords	Neck Pain

Date	3-12-2008
Database	Medline – Pubmed
Search Strategy	Neck pain systematic reviews: Search (Neck Pain [Mesh]) AND systematic review [sb] Limits: published in the last 10 years, Humans, English, French, German, Dutch, all Adult: 19+years: n = 46 Neck pain Clinical queries+therapy+narrow: Search (Neck Pain [Mesh]) AND (randomized controlled trial[Publication Type] OR (randomized[Title/Abstract] AND controlled[Title/Abstract] AND trial[Title/Abstract])) Limits: published in the last 10 years, Humans, English, French, German, Dutch, all Adult: 19+years: n = 185 Neck pain Clinical queries+therapy+broad: Search (Neck Pain [Mesh]) AND ((clinical[Title/Abstract] AND trial[Title/Abstract] OR clinical trials[MeSH Terms] OR clinical trial[Publication Type] OR random*[Title/abstract] OR random allocation[MeSH Terms] OR therapeutic use[MeSH Subheading]) Limits: published in the last 10 years, Humans, English, French, German, Dutch, all Adult: 19+years: n = 632 Neck pain Clinical queries+clinical prediction guides+narrow: Search (Neck Pain [Mesh]) AND (validation[tiab] OR validate[tiab] Limits: published in the last 10 years, Humans, English, French, German, Dutch, all Adult: 19+years: n = 16 Neck pain Clinical queries+clinical prediction guides+broad: Search (Neck Pain[Mesh] AND (predict*[tiab] OR predictive value of tests[mh] OR scor*[tiab] OR observe*[tiab] OR observer variation[mh] Limits: published in the last 10 years, Humans, English, French, German, Dutch, all Adult: 19+years: n = 445 Neck Pain Clinical queries+diagnosis+narrow: Search (Neck Pain[Mesh] AND (specificity[Title/Abstract]) Limits: published in the last 10 years, Humans, English, French, German, Dutch, all Adult: 19+years: n = 19 Neck pain Clinical queries+diagnosis+broad: Search (Neck Pain [Mesh] AND (sensitiv*[Title/Abstract] OR sensitivity and specificity [MeSH Terms] OR diagnos*[Title/Abstract] OR diagnosis[MeSH:noexp] OR diagnostic*[MeSH:noexp] OR diagnosis,differential[MeSH:noexp] OR diagnosis[Subheading:noexp]) Limits: published in the last 10 years, Humans, English, French, German,

	Dutch, all Adult: 19+years: n = 621 Neck Pain Clinical queries+prognosis+narrow: Search (Neck Pain [Mesh] AND (prognos*[Title/Abstract] OR (first[Title/Abstract] AND episode[Title/Abstract]) OR cohort[Title/Abstract]) Limits: published in the last 10 years, Humans, English, French, German, Dutch, all Adult: 19+years: n = 140 Neck pain Clinical queries+prognosis+broad: Search (Neck pain [Mesh] AND (incidence[MeSH:noexp] OR mortality[MeSH Terms] OR follow up studies[MeSH:noexp] OR prognos*[Text Word] OR predict*[Text Word] OR course*[Text Word]) Limits: published in the last 10 years, Humans, English, French, German, Dutch, all Adult: 19+years: n = 370
Note	Only the narrow search will be included because of the big range and a lot of bias. Many articles are not relevant for the study.

SEARCH STRATEGY MEDLINE OTHERS

Author	
Name	Giannoula Tsakitzidis
Project number	PPF08-24-GCP
Project name	Cervicalgia : Diagnosis and Therapy
Keywords	Neck Pain

Date	24-10-2008
Database (	Medline - Pubmed
Search Strategy	"Neck pains" [Mesh] Limits: published in the last 10 years, Humans, Clinical Trial, English, French, German, Dutch, all Adult: 19+years: n = 283 Limits: published in the last 10 years, Humans, Meta-Analysis, English, French, German, Dutch, all Adult: 19+years: n = 6 Limits: published in the last 10 years, Humans, Randomized Controlled Trial, English, French, German, Dutch, all Adult: 19+years: n = 178 Limits: published in the last 10 years, Humans, Review, English, French, German, Dutch, all Adult: 19+years: n = 66
Note	

SEARCH STRATEGY COCHRANE

Author	
Name	Giannoula Tsakitzidis
Project number	PPF08-24-GCP
Project name	Cervicalgia : Diagnosis and Therapy
Keywords	Neck Pain

Date	03-12-2008
Database (name + access ; eg Medline OVID)	Cochrane
Search Strategy (attention, for PubMed, check « Details »)	Neck pain systematic reviews: "Neck Pain" [Mesh]) n = 11
Note	There are **11** results out of **5546 records** for: "MeSH descriptor **Neck Pain** explode all trees in **Cochrane Database of Systematic Reviews**"

SEARCH STRATEGY PEDRO

Author	
Name	Giannoula Tsakitzidis
Project number	PPF08-24-GCP
Project name	Cervicalgia : Diagnosis and Therapy
Keywords	Neck Pain

Date	04-12-2008
Database (name + access ; eg Medline OVID)	Pedro
Search Strategy (attention, for PubMed, check « Details »)	Neck Pain systematic reviews: Search Neck Pain Limits: Since 1998 and systematic reviews n = 62 Search Neck Pain Limits: Since 1998 and practice guidelines: n = 7 Search Neck Pain Limits: Since 1998 and clinical trials n = 150
Note	

SEARCH STRATEGY GUIDELINES

Author Name	Giannoula Tsakitzidis		
Search engine	Search term	number	PICO
GIN	neck pain	9	2
NGC	Cervical/ disease=neck pain/sort order=relevance	4	3
NHS	neck pain	25	0
NZGG	neck pain	1	0
BMJ	neck pain	1	1
			6

SEARCH STRATEGY EMBASE

Author	
Name	Giannoula Tsakitzidis
Project number	PPF08-24-GCP
Project name	Cervicalgia : Diagnosis and Therapy
Keywords	Neck Pain

Date	18-11-2008
Database (name + access ; eg Medline OVID)	Embase
Search Strategy (attention, for PubMed, check « Details »)	Neck pain as Mesh 'neck pain': 'neck pain'/exp AND [systematic review]/lim AND [embase]/lim AND [1998-2008]/py n= 79 'neck pain'/exp AND [controlled clinical trial]/lim AND ([dutch]/lim OR [english]/lim OR [french]/lim OR [german]/lim) AND [humans]/lim AND ([adult]/lim OR [aged]/lim) AND [embase]/lim AND [1998-2008] /py n=250 'neck pain'/exp AND [meta analysis]/lim AND ([dutch]/lim OR [english]/lim OR [french]/lim OR [german]/lim)AND [humans]/lim AND ([adult]/lim OR [aged]/lim) AND [embase]/lim AND [1998-2008]/py n=4 'neck pain'/exp AND ([controlled clinical trial]/lim OR [meta analysis]/lim) AND ([dutch]/lim OR [english]/lim OR [french]/lim OR [german]/lim) AND [humans]/lim AND ([adult]/lim OR [aged]/lim) AND [embase]/lim AND [1998-2008]/py N=251 'neck pain'/exp AND [randomized controlled trial]/ lim AND ([dutch]/lim OR [english]/lim OR [french]/lim OR [german]/lim) AND [humans]/lim AND ([adult]/lim OR [aged]/lim) AND [embase]/lim AND [1998-2008]/py N=183 'neck pain'/exp AND [systematic review]/lim AND ([dutch]/lim OR [english]/lim OR [french]/lim OR [german]/lim)AND [humans]/lim AND ([adult]/lim OR [aged]/lim) AND [embase]/lim AND [1998-2008]/py N= 3
Note	

SEARCH STRATEGY PUBMED SECOND SEARCH

Author	
Name	Giannoula Tsakitzidis
Project number	PPF08-24-GCP
Project name	Cervicalgia : Diagnosis and Therapy
Keywords	Neck Pain
Date	14-05-2009
Database (name + access ; eg Medline OVID)	Pubmed
Search Strategy (attention, for PubMed, check « Details »)	Neck Pain Clinical queries+diagnosis+narrow: Search (Neck Pain[Mesh] AND (specificity[Title/Abstract]) Limits: published in the last 10 years, Humans, English, French, German, Dutch, all Adult: 19+years n= 29 Search (neck pain AND (specificity[Title/Abstract]) Limits: published in the last 10 years, Humans, English, French, German, Dutch, all Adult: 19+years n= 45
Note	Only the narrow search will be included because of the big range and a lot of bias. Many articles are not relevant for the study.

SEARCH STRATEGY EMBASE

Author	
Name	Tsakitzidis Giannoula
Project number	PPF08-24-GCP
Project name	Cervicalgia : Diagnosis and Therapy
Keywords	Neck pain, 'neck pain' [Mesh], diagnosis, specificity
Date	16-06-2009
Database (name + access ; eg Medline OVID)	Embase
Search Strategy (attention, for PubMed, check « Details »)	#1. 'neck pain'/exp/dm_di AND ([dutch]/lim OR [english]/lim OR [french]/lim OR [german]/lim) AND [embase]/lim n= 474 #2. 'neck pain'/exp/dm_di/mj AND ([dutch]/lim OR [english]/lim OR [french]/lim OR german]/lim) AND [embase]/lim AND [humans]/lim AND [embase]/lim AND [1998-2009]/py n= 205 #3. specificity:ti,ab AND [1998-2009]/py N= 131,416 #4. 'neck pain'/exp AND [1998-2009]/py 5,520 16 Jun 2009 #5. #3 AND #4 n= 55 #6. ('neck'/exp OR 'neck') AND ('pain'/exp OR 'pain') AND [1998-2009]/py N= 14,069 #7. #3 AND #6 n= 127 #8. #3 AND #4 AND ([dutch]/lim OR [english]/lim OR [french]/lim OR [german]/lim) AND [embase]/lim N= 49 #9. #3 AND #6 AND ([dutch]/lim OR english]/lim OR [french]/lim OR [german]/lim) AND [humans]/lim AND [embase]/lim N= 101
Note	

APPENDIX 2: CRITERIA USED TO ASSESS THE METHODOLOGICAL QUALITY OF THE STUDIES: RESULTS OF THE QUALITY APPRAISAL

QUALITY APPRAISAL: PAPERS ON DIAGNOSIS

Author (y)	Questions (Quadas for diagnosis instrument)														TOTAL /14	Medium/High
	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
Björkstén, 1999	1	1	1	1	0	1	1	1	1	1	1	1	0	1	12	H
De Hertogh, 2007	1	1	1	1	0	0	1	1	1	1	1	1	0	0	10	H
Vos, 2009	1	1	1	0	1	1	1	1	1	1	1	0	0	0	10	H

For all questions 1=yes

Questions: 1. Was the spectrum of patients representative of the patients who will receive the test in practice? 2. Were selection criteria clearly described? 3. Is the reference standard likely to correctly classify the target condition? 4. Is the time period between reference standard and index test short enough to be reasonably sure that the target condition did not change between the two tests? 5. Did the whole sample or a random selection of the sample, receive verification using a reference standard of diagnosis? 6. Did patients receive the same reference standard regardless of the index test result? 7. Was the reference standard independent of the index test (i.e. the index test did not form part of the reference standard)? 8. Was the execution of the index test described in sufficient detail to permit replication of the test? 9. Was the execution of the reference standard described in sufficient detail to permit its replication? 10. Were the index results interpreted without knowledge of the results of the reference standard? 11. Were the reference standard results interpreted without knowledge of the results of the index test? 12. Were the same clinical data available when test results were interpreted as would be available when the test is used in practice? 13. Were uninterpretable/intermediate test results reported? 14. Were withdrawals from the study explained? Note: Publications with a score < 7 were excluded.

Author (y)	Questions (Dutch Cochrane for diagnosis instrument)							Total/7	Medium/High
	1	2	3	4	5	6	7		
Rubinstein, 2007	1	1	1	1	1	1	1	7	H
Rubinstein, 2008	1	1	1	1	0	0	0	4	M
Sehgal, 2007	1	1	1	1	1	1	0	6	H

For all questions 1=yes

Questions: 1. Is the question adequately formulated? 2. Is search strategy adequately performed? 3. Is the selection procedure of the publications adequately performed? 4. Is the quality appraisal adequately performed? 5. Is the description of the data-extraction adequately performed? 6. Is the description of the study baseline characteristics adequate? 7. Is the meta-analysis correctly performed? Note: Publications with a score < 4 were excluded.

QUALITY APPRAISAL: RCTS ON TREATMENT

Author (y)	Questions (Dutch Cochrane for RCT's instrument)									TOTAL/ 9	Medium/High
	1	2	3	4	5	6	7	8	9		
Helewa, 2007	1	1	0	0	1	1	1	1	1	7	H
O'Leary, 2007	1	1	0	0	1	1	1	1	1	7	H
Ylinen, 2007	1	1	0	0	1	1	1	1	1	7	H
Cleland, 2007	1	1	0	0	1	1	1	1	1	7	H
Hakkinen, 2008	1	1	0	0	1	1	1	1	1	7	H
Hakkinen, 2007	1	1	0	0	1	1	1	1	1	7	H
Itoh, 2007	1	1	1	0	1	1	1	1	1	8	H
Vas, 2006	1	1	0	0	1	1	1	1	1	7	H
Willich, 2006	0	0	0	0	1	1	1	1	1	5	M
Ma, 2008	1	0	1	0	0	1	1	1	1	6	M
Bernaards, 2008	1	1	0	0	1	1	1	1	1	7	H
Voerman, 2007	1	1	0	0	0	1	1	1	1	6	M
Brockow, 2001	1	1	1	1	1	1	1	1	1	9	H

For all questions 1=yes

Questions: 1. Is the randomisation well performed? 2. Was there an allocation concealment? 3. Were the patients blinded for treatment? 4. Were the administrators blinded for treatment? 5. Was there a blinding of outcome assessment? 6. Was there similarity of groups at the start of the study? 7. Was the description of losses to follow up/withdrawals available? 8. Was the intention-to-treat reported? 9. Were the groups equally provided of care? Note: Publications with a score < 4 were excluded.

QUALITY APPRAISAL: SYSTEMATIC REVIEWS

Author (y)	Questions (Dutch Cochrane for SR instrument)								TOTAL/ 8	Medium/High
	1	2	3	4	5	6	7	8		
Borghouts, 1998	1	1	1	1	0	1	1	1	7	H
Chow, 2005	1	1	1	1	1	1	1	1	8	H
Ezzo, 2007	1	1	1	1	1	1	1	1	8	H
Gemmell, 2006	1	1	1	1	0	1	1	1	7	H
Graham, 2006	1	0	0	1	1	0	1	1	5	M
Gross, 2007	1	1	1	1	1	1	1	1	8	H
Gross, 1998	1	1	1	1	1	1	1	1	8	H
Gross, 2002	1	1	1	1	1	0	1	0	6	M
Gross, 2004	1	1	1	1	1	1	1	1	8	H
Haines, 2008	1	1	1	0	1	1	1	1	7	H
Haraldsson, 2006	1	1	1	1	1	0	1	1	7	H
Hurwitz, 2008	0	1	1	1	1	1	1	1	7	H
Karjalainen, 2003	1	1	1	1	0	1	1	0	6	M
Kay, 2005	1	1	1	1	1	1	0	0	6	M
Kroeling, 1	1	1	1	1	1	1	1	1	8	H
Macauly, 2007	1	1	1	1	1	0	1	1	7	H
Peloso, 2007	1	1	1	1	1	1	1	1	8	H
Sarig-Bahat, 2003	1	1	1	1	0	1	1	0	6	M
Saragiovannis, 2005	1	1	1	1	0	1	1	1	7	H
Shields, 2006	1	1	1	1	1	1	0	1	7	H
Trinh, 2006	1	1	1	1	1	1	1	1	8	H
Vernon, 2007	1	1	1	1	1	1	1	1	8	H
Vernon, 2005	1	1	1	1	0	1	0	0	5	M
Vernon, 2007(b)	1	1	1	1	1	1	0	0	6	M

For all questions 1=yes

Questions: 1. Is the question adequately formulated? 2. Is search strategy adequately performed? 3. Is the selection procedure of the publications adequately performed? 4. Is the quality appraisal adequately performed? 5. Is the description of the data-extraction adequately performed? 6. Is the description of the study baseline characteristics adequate? 7. Is the meta-analysis correctly performed? 8. Is the statistical pooling correctly performed? Note: Publications with a score < 4 were excluded.

QUALITY APPRAISAL: AGREE SCORES FOR THE 2 SELECTED GUIDELINES

	GUIDELINES **TOPICS**	**CKS**	**BMJ**
	Onderwerp en doel		
	Doel van richtlijn spec beschreven Klinische vragen spec. Beschreven Ptenpopulatie spec beschreven	4 4 3	4 2 3
		11	9
	Standaarddomeinscore	88,89	66,67
	Betrokkenheid van belanghebbenden		
	leden uit alle relevante beroepsgroepen perspectief en voorkeuren v pt nagegaan beoogde gebruikers duidelijk benoemd richtlijn getest onder gebruikers	4 4 3 1	2 1 2 1
		1	1
	Standaarddomeinscore	-25	-25
	Methodologie		
	systematische methoden gebruikt criteria voor selectie behouden methoden van opstelling beschreven gezondheidswinst, risico's beschreven expliciet verband tssen wet materiaal en aanb beoordeling door externe experts procedure voor herziening	4 4 4 1 4 2 1	4 4 4 4 4 2 4
		20	26
	Standaarddomeinscore	61,9	90,48
	Helderheid en presentatie		
	aanbeveling specifiek en ondubbelzinnig beleidsopties vermeld kernaanbeveling herkenbaar hulpmiddelen	4 2 4 2	4 2 4 2
		12	12
	Standaarddomeinscore	66,67	66,67
	Toepassing		
	organisatorische belemmeringen kostenimplicaties overwogen criteria voor toetsing en om na te gaan of ze gevolgd wordt	1 1 1	1 2 1
		3	4
	Standaarddomeinscore	0	11,11

	Onafhankelijkheid van opstellers		
	geen beïnvloed door belangen van financiers conflicterende belangen vastgelegd	1 1	4 4
		2	8
	Standaarddomeinscore	0	100
BESLUIT			
1	Sterk aan te bevelen	1	1
2	Aan te bevelen (onder voorwaarden of met veranderingen)		
3	Niet aan te bevelen		
4	Onzeker		

APPENDIX 3: EVIDENCE TABLE OF INCLUDED SYSTEMATIC REVIEWS

Reference	Cochrane code medium (4,5,6) or high (>6) max=8	Date of publication	Research question	Included studies	Last search	Patients	Intervention	Compared group	Outcome	Extraction data/results	Conclusion of the author
Borghouts, J. A., B. W. Koes, et al. (1998). "The clinical course and prognostic factors of non-specific neck pain: a systematic review." Pain 77(1): 1-13.	high (7)	1998	systematic review of the clinical course and prognostic factors of non-specific neck pain	1. Abbot, 1990 (observational study) 2. Berg, 1988 (observational study) 3. Gore, 1987 (observational study) 4. Rossignol 1988/Abenheim 1988 (observational study) 5. Takala, 1992 (observational study) 6. Tellnes, 1989 (observational study) 7. Anonymous, 1966 (RCT) 8. Coan, 1982 (RCT) 9. Ceccherelli, 1989 (RCT) 10. Foley-Nolan, 1990 (RCT) 11. Goldie and Landquist, 1970 (RCT) 12. Horvath, 1983 (RCT) 13. Howe, 1983 (RCT) 14. Jensen, 1995 (RCT) 15. Levoska and Keinänen-Kiukaaniemi, 1993 (RCT) 16. Loy, 1983 (RCT) 17. Nordeman and thörner, 1981 (RCT) 18. Petrie and Hazleman, 1986 (RCT) 19. Revel, 1994 (RCT) 20. Sloop, 1982 (RCT) 21. Takala, 1994 (RCT) 22. Thorsen, 1992 (RCT) 23. Vasseljen, 1995 (RCT)	1996	patients suffering non-specific neck pain	non in the observational studies Many different types of interventions in the RCT's (eg. Traction, acupuncture, laser, collar, NSAID, combination therapy, …)	non in the observational studies Comparison to placebo, no therapy or between two active treatments in the RCT's	two main categories: 1. course of complaints 2. prognostic factors	For pain: 46% had less pain (22-79%) For general improvement: 47% had a general improvement (37-95%) For reduction in use of analgetics: 37% redused the use of analgetics (32-80%)	The authors acknowledge that the methodological quality is rather low. So, they recommend more research into this area of medcine. Very limited information on the course of acute neck pain. Very limited evidence regarding prognostic factors.
Chow RT, Barnsley L: Systematic review of the literature of low-level laser therapy (LLLT) in the management of neck pain. Volume 37. 2005:46-52.	high (8)	2005	A systematic review to determine the efficacy of low-level laser therapy (LLLT) in the treatment of neck pain and to determine if there were any specific laser parameters or techniques of application that were more likely to yield a positive outcome.	1. Toya, 1994 2. Soriano, 1996 3. Laakso, 1997 4. Ozdimir, 2001 5. Hakguder, 2003	febr. 2004	adults (>16 years) suffering from acute or chronic mechanical (non-specific) neck pain (including conditions described variously as "myofascial pain", "trigger points" or "localized fibromyalgia")	Low-level laser therapy	Sham in 4 of the five included studies. Exercise with LLLT and exercise alone in one included study.	observed change in pain scores before and after treatment.	Effect size (ES) for pain reduction was calculated for the studies of Ozdemir and Hakguder. ES was small for values >0,2-0,4, moderate if >0,5-0,7 and large if >0,8. ES for pain reduction was large for both studies, in the study of Ozdemir ES was 3,9 and in Hakguder 1,8. In the study of Sariano a self reported improvement of 60% was defined as effective. The results showed 94,59% for the treated group and 38,24% in the placebo group. Complete pain relief was acieved in 67,59% in the group of LLLT and 17,65% in the placebo group. In the report of Toya, the treatment of chronic pain with a single session of LLLT achieved affective pain relief in 82% (treatment group) of 42% (placebo group). The results from the study of Laakso were categorized as inconclusive because the outcomes were based on within group analyses and so no comparison was made between the groups.	Notwithstanding the heterogeneity of the studies identified within this review, LLLT with infrared wavelengths appears to be efficacious for the treatment of neck pain with limited evidence being provided. Details of the most effective energy densities, sittes of treatment and mechanisms of actions remain unresolved.

Ezzo J, Haraldsson BG, Gross AR, Myers CD, Morien A, Goldsmith CH, Bronfort G, Peloso PM: Massage for mechanical neck disorders: A systematic review. Volume 32. 2007:353-362.	high (8)	2007	A systematic review to assess the effect of massage on pain, function, patient satisfaction, cost of care and adverse events in adults with neck pain.	1. Ammer and Rathkolb, 1990 2. Brodin, 1985 3. Cen, 2003 4. Fialka, 1989 5. Gam, 1998 6. Hanten, 1997 7. Hanten, 2000 8. hou, 2002 9. Hoving, 2002 10. Irnich, 2001 11. jordan, 1998 12. Karlberg, 1996 13. Koes, 1991-1992) 14. Kogstad, 1978 15. Levoska, 1993 16. Nilsson, 1995-1997 17. Provinciali, 1996 18. Reginiussen, 2000 19. Schnabel, 2002	sept. 2004	adults who suffered from acute (<30 days), subacute (30-90 days) or chronic (>90 days). MND (with whiplash grade I-II included), NDH and NDR (inclusion of whiplash grade III)	cerveral masage techniques were included. Massage in multimodal approaches.	no treatment, other multimodal approaches, …	effect on pain, function, patient satisfaction, cost of care and adverse events	inability to pool data.	no level of evidence could be found for massage alone compared with a contral. No level of evidence could be found for or against massage in the studies that combined massage with other methods. No firm statement can be made about the efficacy of massage for neck pain due to the limitations of existing studies.
Gemmell H, Miller P: Comparative effectiveness of manipulation, mobilisation and the Activator instrument in treatment of non-specific neck pain: A systematic review. Volume 14. 2006.	high (7)	2006	A systematic review to critically appraise the literature that directly compared manipulation, mobilisation and the Activator instrument for non-specific neck pain.	1. Vernon, 1990 2. Cassidy, 1991 3. Yurkiw, 1996 4. Wood, 2001 5. Hurwitz, 2002	oct. 2005	patients suffering non-specific neck pain, age or duration of symptoms was not considered.	Hig Velocity Low Amplitude rotational manipulation (HVLA-rotation manipulation), oscillatory mobilisation, Activator, deversified HVLA manipulation, post isometric relaxation (PIR), HVLA manipulation with heat, HVLA manipulation without heat, HVLA with electrical stimulation, HVLA without electrical stimulation, obilisation with	the different treatment modalities compared with each other	Pressure pain treshold. Numerical rating scale (NRS) for pain. Cervical ROM. Cervical lateral flexion. VAS for pain. NRS for pain. Neck Disability index. SF-36. Adverse reactions with care. Patient global assessment. ?	not remlevant because of poor quality of included studies	due to lack in quantity and quality of studies reviewed, more high-quality research is needs to be done before a recommendation can be made as to which type of manual therapy has better effectiveness and safety profile for non-specific neck pai.

Graham N, Gross A, Goldsmith CH, Klaber Moffett J, Haines T, Burnie SJ, Peloso PM: Mechanical traction for neck pain with or without radiculopathy. Cochrane Database Syst Rev 2008(3):CD006408.	medium (5)	2006	A systematic review to assess wether mechanical traction, either alone or in combination with other treatments , improves pain, function/disability, patient satisfaction and global perceived effect in adults with mechanical neck disorders.	1. Brewerton, 1966 2. Goldie, 1970 3. Guangyue, 2001 4. Klaber-Moffett, 1990 5. Kogstad, 1978 6. Loy, 1983 7. Pennie, 1990 8. Shakoor, 2002 9. Wong, 1997 10. Zybergold, 1985		mechanical neck disorder (including WAD graad 1 and 2, myofascial pain, degenerative changes). Neck disorders with headache. Neck disorders with radicular findings.	mechanical traction techniques	placebo or a control	pain relief, disability/function, patient satisfaction and global perceived effect.	traction vs placebo for pain intensity outcome: * Zybergold: -0,78 (-1,36,-0,21) decreased pain (intermittent traction: acute to chronic MND, NDR, DC at 6 weeks treatment) * Goldie: 0,5 (0,27, 0,90) favours treatment (intermittent traction: chronic MND/NDR at three weeks treatment + 3 weeks follow-up)	Inconclusive evidence for both continuous and intermittent traction exists due to trial methodological quality. ==> * Data analysis reveals moderate evidence of benefit for intermittent traction, which denotes findings in a single , high-quality RCT or consistent findings in multiple low-quality trials. * There was moderate evidence of no benefit for continuous traction.
Gross, A. R., C. Goldsmith, et al. (2007). "Conservative management of mechanical neck disorders: a systematic review." The Journal of Rheumatology 34(5): 1083-1102.	high (8)	2007	To assess effectiveness of conservative treatments (manual, physical therapy, medication, patient education) for patients with mechanical neck disorders	1. Allison, 2002 2. Karlberg, 1996 3. Jull, 2002 4. Brodin, 1985 5. Gam, 1998 6. Bronfort, 2001 7. Evans, 2002 8. McKinney, 1989, 1989 9. Taimela, 2000 10. Revel, 1994 11. Mealy, 1986 12. Cen, 2003 13. Zybergold, 1985 14. Goldie, 1970 15. Petrie, 1986 16. Irnich, 2001, 2002 17. Birch, 1998 18. White, 2000, 2004 19. Coan, 1982 20. Ceccherelli, 1998 21. Ozdemir, 2001 22. Soriano, 1996 23. Taverna, 1990 24. Rigato, 2002 25. Troik, 1994 26. Foley-Nolan, 1992, 1994 27. Thuile, 2002 28. smaria, 2003 29. Petterson, 1998 30. Esenyel, 2000	sep/04	adults >18years or older, who suffered from acute (less than 30 days), subacute (30 to 90 days) or chronic (longer than 90 days) neck disorders. MND: mechanical neck disorders, including WAD I-II, myofascial neck pain, and degenerative changes NDH: Neck disorders with headache NDR: Neck disorders with radicular findings	Medication, medicinal injections, acupuncture, electrotherapy, exercises, low-level laser therapy, orthosis, thermal agents, traction, massage, mobilisation, manipulation and patient education.	placebo, wait-list, no treatment or active treatment contral (e.g. Exercises and ultrasound and ultrasound) or inactive treatment control (e.g. sham, transcutaneous electrical nerve stimulation)	pain, disability /function including work related measures, patient stisfaction and global perceived effect. Follow-up periods were defined as post treatment , short-term, intermediate term and longterm .	Taken form the conclusion: - a multimodal management approach (exercises, mobilisation/manipulation) is compatible with 28% to 70% treatment advantage over a control and with a long term benefit in pain reduction of 25 mm on a numeric rating scale (0-100mm) from baseline for 1 in 2 to 5 patients with subacute or chronic MND.	For treatment of subacute and chronic MND, our review found evidence favoring a multimodal strategy (exercises and mobilisation/manipulation) , exercises alone, intramuscular lidocaine injection and low-level laser therapy for pain, function and GPE in short and long term. Acupuncture, low-frequence pulse electromagnetic field, repetitive magnetic stimulation, cervical orthopedic pillow and traditional Chinese massage are favored for either immediate or short term pain management.
Gross, A. R., P. D. Aker, et al. (1998). "Physical medicine modalities for mechanical neck disorders." Cochrane Database Syst Rev(2): CD000961.	high (8)	1998	The objective of this review was to assess the effects of physical medcine modalities for pain in adults with mechanical neck disorders.	1. Foley-Nolan, 1990 2. Foley-Nolan, 1992 3. Goldie, 1970 4. Levoska, 1993 5. Lewith, 1981 6. Loy, 1983 7. Nordemar, 1981 8. Pennie, 1990 9. Petrie, 1983 10. Snow, 1992 11. Thorsen, 1991 12. Thorsen 1992 13. Waylonis, 1988	dec/93	adults with mechanical neck disorders	physical medcine modalities		pain, tenderness, ROM, medication use, activities of daily living, return to work status, patient performance or costs of treatment		At most three trials were accumulated demonstrating some benefit for electromagnetic therapy and no benefit for laser therapy in terms of pain reduction.

Gross, A. R., T. Kay, et al. (2002). "Manual therapy for mechanical neck disorders: a systematic review." Man Ther 7(3): 131-49.	medium (6)	2002	To determine whether manual therapy improves pain, function and patient satisfaction in adults suffering from mechanical pain disorders	1. Ammer and Rathkolb, 1990 2. Bitterli, 1977 3. Brodin, 1985, 1984 4. Bronfort, 2001, 1998, 1997, 1996 5. Cassidy, 1992 6. David, 1998 7. Geibel, 1997 8. Jensen, 1990 9. Jordan, 1998 10. Karlberg, 1996 11. Koes, 1992, 1991, 1992b, 1993 12. McKinney, 1989 13. Mealy, 1986 14. Nilsson, 1997 15. Nordemar and Thorner, 1981 16. Parkin-Smith and Penter, 1997 17. Provinciali, 1996 18. Sloop, 1982 19. Vasseljien, 1995 20. Vernon, 1990	dec/1997 personal files 1998	adults older than 18 years; however inclusion of patients with many different aspecific and specific pain syndromes (eg. Whiplash, radicular signs and symptoms).	manipulation alone, mobilization alone, manipulation plus mobilization, and combination of both with massage or exercise or multimodal care	comparison between two or more interventions, sometimes also compared to doing nothing (patient staying on waiting list)	Pain, function, patient satisfaction	Manupulation in one session shows no benefit at all for pain reduction. High-tech exercise and manipulation showed benefit over 20 sessions. The effect of mobilisation on pain remains unclear at this stage? manipulation + mobilization showed no benefit on pain versus placebo. multimodal therapies showed efficacy in acute, subacute and chronic conditions (one trial showed a NNT of 2-6 with a 37-41% treatment advantage). However, some studies showed no benefit!	Results remain inconclusive. For mechanical neck disorders, with and without headache, it appears to be most beneficial, manual therapies should be done with exercise for improving pain and patient satisfaction. Manipulation and mobilization alone appear to be less effective.
Gross, A., L. Hoving Jan, et al. (2004) Manipulation and mobilisation for mechanical neck disorders. Cochrane Database of Systematic Reviews DOI: 10.1002/14651858.CD004249.pub2	high (8)	2004	To assess the effect of manipulation and mobilisation either alone or in combination with other treatments on pain, function, patient satisfaction and global perceived effect in adults with mechanical neck disorders.	1. Allison, 2002 2. Ammer, 1990 3. Bitterli, 1977 4. Brodin, 1984, 1985 5. Bronfort, 2001 6. Cassidy, 1992 7. Coppieters, 2002 a+b 8. David, 1998 9. Giebel, 1997 10. Giles, 1999 11. Hoving, 2002, 2001 12. Korthals-de-Bos, 2002 13. Howe, 1983 14. Hurwitz, 2002 15. Jensen, 1990 16. Jordan, 1998 17. Jull, 2002 18. Karlberg, 1996 19. Koes, 1992(a,b,c,d,e), 1993 20. Kogstad, 1978 21. Mckinney, 1989 (a,b) 22. Mealy, 1986 23. Nilsson, 1995, 1996, 1997 24. Norderman, 1981 25. Parkin-Smith, 1998 26. Persson, 1996-2001 27. Provinciali, 1996 28. Reginiussen, 2000 29. Skargren, 1997,1998 30. Sloop, 1982 31. van Schalkwyk, 2000 32. Vasseljen, 1995 33. Vernon, 1990 34. Wood, 2001	march/2002	adults >18years or older with the following neck disorders: - Mechanical neck disorders including WAD, myofascial neck pain, and degenerative changes. -Neck disorders with headache. - Neck disorders with radicular findings, including WAD category III.	Manipulation or mobilisation techniques. These techniques in combination with other treatment agents in what is called multimodal care.	Control group (placebo control, active control, or no treatment control) or various other treatment groups.	pain relief, disability/function, patient satisfaction and global perceived effect.		Multimodal care including mobilisation and/or manipulation plus exercises, is beneficial for pain relief, functional improvement and global perceived effect for subacute/chronic mechanical neck disorder with or without headache. The evidence did not favour manipulation and/or mobilisation done alone or in combination with various other types of treatments for pain, function, and global perceived effect.
Haines, T., A. Gross, et al. (2008) "Patient education for neck pain with or without radiculopathy (Cochrane review) [with consumer summary]."	high (7)	2008	To assess wether patient education strategies, either alone or in combination with other treatments, are of benefit for pain, function or disability, patient satisfaction, ratings of overall effectiveness, knowledge transfer, or behaviour change in adults with mechanical disorders.	1. Borchgrevink, 1998 2. brison, 2005 3. Brodin, 1984-1985 4. Crawford, 2004 5. Ferrari, 2005 6. Glossop, 1982 7. Horneij, 2001 8. Hoving, 2002 9. Jensen, 1995 10. Karlberg, 1998 11. Kamwendo, 1991 12. Klaber Moffet, 2005 13. Koes, 1992 14. Kogsted, 1978 15. Kongsted, 2007 16. Lundblad, 1999 17. mcKinney, 1989 18. Mealy, 1986 19. Oliveira, 2005 20. Persson, 2001 21. Provinciali, 1996 22. Rosenfeld, 2003 23. Soderlund, 2001 24. Taimela, 2000	june/2008	adults >18years or older, who suffered from acute (less than 30 days), subacute (30 to 90 days) or chronic (longer than 90 days) neck disorders. Neck disorders without radiculopathy, including WAD, myofascial neck pain, and degenerative changes Cervicogenic headache Neck disorders with radicular findings.	educational techniques (basic definition: consumer education was any learning experience intended to influence consumer health knowledge and behaviour (Barlett, 1985))	placebo, other treatment added to both arms of the trial, wait list or no treatment or another treatment (for example: education vs another intervention, one technique of education vs another, one "dose" of education vs another dose.	pain relief, disability/function, patient satisfaction, quality of life and global perceived effect. Secondary outcomes collected were: knowledge transfer, behaviour change, adverse events and cost of care. Periods were defined as: immediately post treatment (less than or equal to one day), short term follow-up (greater than equal to three months to less than equal to one year) and long term follw-up (greater than or equal to one year).	not possible!	This review has not shown efectiveness for educational interventions in various disorder types and follow-up periods, including advice to activate, advice on stress coping skills, and 'neck school'.

Haraldsson, B., A. Gross, et al. (2006) Massage for mechanical neck disorders. Cochrane Database of Systematic Reviews DOI: 10.1002/14651858.CD004871.pub3	high (7)	2006	To assess the effect of massage on pain, function, patient satisfaction and cost of care in adults with neck pain.	1. Ammer, 1990 2. Brodin, 1983, 1985 3. Cen, 2003 4. Fialka, 1989 5. Gam, 1998 6. Hanten, 1997, 2000 7. Hoving, 200é, 2001 ch5, 2001 ch6 8. Hou, 2002 9. Irnich, 2001 10. Jordan, 1998 11. karlberg, 1996 12. Koes, 1991, 1992 a,b,c,d,e, 1993 13. Kogstad, 1978 14. Levoska, 1993 15. Nilsson, 1995, 1996, 1997 16. Provinciali, 1996 17. Reginiussen, 2000 18. Schnabel, 2002	sep/04	adults >18years or older, who suffered from acute (less than 30 days), subacute (30 to 90 days) or chronic (longer than 90 days) neck disorders. MND: mechanical neck disorders, including WAD I-II, myofascial neck pain, and degenerative changes NDH: Neck disorders with headache NDR: Neck disorders with radicular findings	Massage	different types of treatment (e.g. acupuncture, exercises, manipulation, ...)	pain relief, neck-related disability, function, patient staisfaction and global perceived effect.	Main results: -Massage vs Control treatments, outcome Pain intensity. (favours treatment) Massage+TENS+hot packs+active ROM vs hot packs+activeROM (Hou, 2002) -1,07[-1,91,-0,24] Massage+interferential current+hot packs+activeROM vs hot pack+activeROM (Hou, 2002) -1,20[-2,05,-0,36] Massage+exercises+ultrasound vs no-treatment control (Gam, 1998) -0,75[-1,40,-0,10] Massage+mobilisation+exercise+relaxation+analgesic+ED vs wait list (Karlberg, 1996) -1,47[-2,58,-0,36] Massage +exercises+traction vs Iantophoresis (Fialka, 1989) 0,17[0,03-0,85] massage+exercise+hot pack+control vs soft collar+NSAID +Rantidin (Schnabel, 2002) Mobilisation/massage+exercises(eye	the contribution of massage to managing cervical pain remains unclear. There is no evidence found for massage alone relative to a control. Also no evidence is found for or against massage in studies that combined massage with other modalities. Most studies lacked a definition, descrition, or rationale of massage as a treatment or the massage technique selected.The massage treatment components need to be reprted in a transparent and standardized way. So because of the limitation in the existing studies no firm statement can be made to guide clinical practice.
Hurwitz, E. L., E. J. Carragee, et al. (2008). "Treatment of neck pain: noninvasive interventions. Results of the Bone and Joint Decade 2000 to 2010 Task Force on Neck Pain and its Associated Disorders [with consumer summary]." Spine 33(4 Suppl): S123-S152.	high (7)	2008	To identify, critically appraise, and synthesize literature from 1980 through 2006 on noninvasive interventions for neck pain ans its associated disorders.	1. Hong, 1982 2. Karppinen, 1999 3. Koes, 1991 4. Koes, 1992 5. Koes, 1993 6. Gam, 1998 7. Wheeler, 2001 8. Ozdemir, 2001 9. Ceccherelli, 1989 10. Gur, 2004 11. Chow, 2006 12. Thorson, 1992 13. Irnich, 2002 14. Irnich, 2001 15. Vas, 2006 16. He, 2004 17. He, 2005 18. Sterling, 2001 19. Hoivik, 1983 20. Yamamoto, 1983 21. Berry, 1981 22. White, 2000 23. Cleland, 2005 24. Smania, 2005 25. Horneij, 2001 26. Hoving, 2002 27. Hoving, 2006 28. Korthals-de-Bos, 2003 29. Ekberg, 1994 30. Taimela, 2000 31. Witt, 2006 32. Willich, 2006 33. Ylinen, 2003 34. Ylinen, 2005 36. Zybergold, 1985 37. Viljanen, 2003 38. Aaras, 1998 39. Aaras, 2001 40. Jull, 2002 41. Stanton, 2003 42. van den Heuvel, 2003 43. Brodin, 1984 44. David, 1998 45. Dziedzic, 2005 46. Hagberg, 2000 47. Martinez-Segura, 2006 48. Hurwitz, 2002 49. Wood, 2001 50. Jordan, 1998 51. Klaber-Moffett, 2005 52. Manca, 2006 53. Bronfort, 2001 54. Evans, 2002 55. Chiu, 2005 56. Revel, 1994 57. Lavin, 1997 58. Persson, 1997 59. Skillgate, 2007 60. McReynolds, 2005	from 1980 up to March 2007	Patients with nonspecific Neck pain or associated Disorders.	noninvasive interventions	placebo or sham, "usual care", no care, or another intervention	pain and disability outcomes evaluated on clinical importance	No exatraction is possible because of the enourmes included studies. No pooling is performed because of the heterogeneity between the study, studypopulation, intervention groups, outcome measures, follow-up time, esitamted effects	For neck disorders without radicular signs or symptoms (grades I and II), the evidence suggests that manual (manipulation or mobilisation) and exercise interventions, LLLT, and perhaps acupuncture are more effective than no treatment, sham, or alternative interventions; however, none of these treatments is clearly superior to any other in either the short- or long-term. For disorders without trauma, the evidence favors supervised exercise sessions with or without manual therapy over usual or no care. Of the manual therapies, manipulation and mobilisation yield comparable clinical outcomes. It should be noted that the safety and efficacy of thoracic manipulation as a promising alternative to cervical manipulation has recently been investigated deserves further examination. The risk for serious side effects from

Karjalainen K, Malmivaara A, van Tulder M, Roine R, Jauhiainen M, Hurri H, Koes B: Multidisciplinary biopsychosocial rehabilitation for neck and shoulder pain among working age adults. Cochrane Database Syst Rev 2003(2):CD002194.	medium (6)	2003	To determine the effectiveness of multidisciplinary biopsychosocial rehabilitation for neck and shoulder pain among working age adults.	1. Ekberg, 1994 2. Jensen, 1995	nov/02	Patients with neck or shoulder pain (no distinction)	multidisciplinary rehabilitation vs none: active multidisciplinary rehabilitation (physical training + education+information+social interaction + work place visit). (multidisciplinary rehabilitation with a psychologist working with patients, Multidisciplinary rehabilitation with a psychologist coaching the team	traditional treatment (medication, physio, rest and sick leave	sick leave, pain, health-related behavior, working conditions. 2 years follow-up		Based on the two trials (low methodological quality) it could not be shown that multidisciplinary rehabilitation is better than usual care.
Kay, T. M., A. Gross, et al. "Exercises for mechanical neck disorders (Cochrane Review) [with consumer summary]."	medium (6)	2005	To assess the effect of exercise therapy on pain relief,patient satisfaction and global perceived effect and function. Where appropriate the influence of methodological quality, duration of the disorder, subtypes of neck disorder and treatment effect.	1. Allison, 2002 2. Brodin, 1984, 1985 3. Bronfort, 2001 4. Fitz-Ritson, 1995 5. Gam, 1998 6. Geibel, 1997 7. Goldie, 1970 8. Hagberg, 2000 9. Hanten, 2000 10. Hoving, 2001a,b 11. Jordan, 1996, 1998 12. Jull, 2002 13. Karlberg, 1996 14. Koes, 1991, 1991a,1992a,b,c,d,e, 1993 15. Kogstad, 2002 16. Levoska, 1993 17. Lundblad, 1999 18. McKinney, 1989, 1998 19. Mealy, 1986 20. Pennie, 1990 21. Persson, 2001 22. Provinciali, 1996 23. Randlov, 1998 24. Revel, 1994 25. Rosenfeld, 2000 26. Soderlund, 2000, 2001 27. Taimela, 2000 28. Takala, 1994 29. Vasseljen, 1995 30. Waling, 2002 31. Ylinen, 2003	march/ 2004	adults >18years or older, who suffered from acute (less than 30 days), subacute (30 to 90 days) or chronic (longer than 90 days) neck disorders. MND: mechanical neck disorders, including WAD I-II, myofascial neck pain, and degenerative changes NDH: Neck disorders with headache NDR: Neck disorders with radicular findings	exercises (e.g. specific neck exercises, shoulder exercises, active exercises, stretching, strengthening, postural, functional, eye-fixation, proprioception exercises, home exercises)	other therapies or no treatment(other therapies e.g. neural treatment, anagesic, manual traction, mobilisation, electrical stimulation, education, … applied alone or in cominiation)	pain , measures of function/disability, patient satisfaction, global perceived effect.	Favouring treatment Exercise vs control effect on pain: - McKinney, 1989 -0,77[-1,20,-0,35] - Jull, 2002 -0,75[-1,17,-0,34] - Jull, 2002 (45w follow-up) -0,59[-1,0,-0,18] - Goldie, 1970 (3wfollow-up) 0,42[0,21-0,8] - Ylinen, 2003(52wtreatment)0,52[0,37-0,73] Exercise vs control effect on function: - Revel, 1994 (8wtreatment+2wfollow-up) 0,55[0,33-0,89] NNT and treatment advantage: pain relief with multimodal care. NNT Advantage% - Jull, 2002 5 40,8 - Rosenfield, 2000 5 38 - Skargren, 1997, 1998 4 26,1	Exercise, both stretching and/or strengthening (of the cervical or shoulder region) and vertigo/eye-fixation exercises, are more benneficial than no treatment. A multimodal care approach of exercise combined with mobilisations or manipulations for subacute and chronic MND with or without headache, reduced pain, improved function, and high global perceived effect in the short and long term. It is unclear what the relative benefit of exxercises therapy is when compared to other treatments. the relative benefit of different exercise approaches is unclear. It was not possible to determine which technique or dosage was more beneficial or if certain subgroups benefit more from one form of care than another.

Kroeling P, Gross AR, Goldsmith CH: A Cochrane review of electrotherapy for mechanical neck disorders. Spine 2005, 30(21):E641-648.	high (8)	2005	To assess whether electrotherapy relieves pain or imrpoves function/disability in aults with mechanical neck disorders	1. Ammer, 1990 2. Chee, 1986 3. Foley-Nolan, 1990 4. Foley-Nolan, 1992 5. hong, 1982 6. Hsueh, 1997 7. Norderman, 1981 8. Persson, 2001 9. Philipson, 1983 10. Provinciali, 1996 11. Trock, 1994	march 2003	adults >18years or older, who suffered from acute (less than 30 days), subacute (30 to 90 days) or chronic (longer than 90 days) neck disorders. MND: mechanical neck disorders, including WAD I-II, myofascial neck pain, and degenerative changes NDH: Neck disorders with headache NDR: Neck disorders with radicular findings	all studies used at least one type of electrotherapy: - Galvanic current modulated DC or fradic stimulation - EMS (electrical muscle stimulation - TENS (transcutaneous electrical nerve stimulation) - interferential or diadynamic current - PEMF: pulsed electromagnetic fields - static magnetic fields	placebo or wait list or an active comparison group	pain relief, disability/function, patient satisfaction and global perceived effect.	there was no possibility to perform any calculation because the data were incompatible.	Kroeling et al dididn't find convincing evidence of a clinically important benefit of electrotherapy for MND. The current evidence is lacking, limited, or conflicting.
Macaulay, J., M. Cameron, et al. (2007). "The effectiveness of manual therapy for neck pain: a systematic review of the literature." Physical Therapy Reviews 12(3): 261-267.	high (7)	2007	To determine the effectiveness of manual therapy for mechanical disorders in reducing pain and disability in adult populations.	1. Dziedzic, 2005 2. Evans, 2002 3. Jull, 2002 4. Hoving, 2006 5. martinez-Segura, 2006	2006	adults with mechanical neck pain	manual therapy (combination of therapies e.g. SM, mobilisation, massage and muscle energy technique applied either alone or with another intervention)	other therapy (combination of therapies e.g. SM, mobilisation, massage and muscle energy technique applied either alone or with another intervention) or no therapy	pain relief disability/function, patient satisfaction, global perceived effect, overall improvement and adverse effects.	For pain the scores were not significant between groups (p=0,84).	Although there is strong evidence suggesting that there are no statistically significant differences in the effectiveness of manual therapy compared with other interventions, patients receiving manual therapy interventions were significantly more satisfied with their care. Despite the absence of statistically significant results when compared to other interventions, patients receiving manual therapy demonstrated improvements in both the short and long term on a variety of outcomes. These results suggest that multimodal approach including manual therapy and exercises, is a potentially useful intervention in the management of mechanical neck disorders, however further research is necessary to determine the cost-effectiveness of this approach in comparison to other interventions.

Peloso Paul Michael, J., A. Gross, et al. (2007) Medicinal and injection therapies for mechanical neck disorders. Cochrane Database of Systematic Reviews DOI: 10.1002/14651858.CD000319.pub4	high (8)	2007	To determine what medication are effective in adults with mechanical disorders, wether these medication were delivered by oral, intravenous, intramuscular or intra-articular routes.	1. Barensley, 1994 2. Basmajian, 1978 3. Basmajian, 1983 4. Bose, 1999 5. brockow, 2001 6. Castagnera, 1994 7. Cheshire, 1994 8. Choffray, 1987 9. Dennert, 1976 10. Dostal, 1978 11. Esenyel, 2000 12. Ferrznte, 1998 13. Freund, 2000 14. Giles, 1999 15. Ginsberg, 1980 16. Heikkila, 2000 17. Hong, 1994 18. Inan, 2001 19. Kamanli, 2005 20. Koes, 1991-1993 21. McReynolds, 2005 22. Nasswetter, 1998 23. Payne, 1964 24. Petterson, 1998 25. Rubenthaler, 2000 26. Salzman, 1993 27. San Martin, 1978 28. Sand, 1992 29. Schnider, 2002 30. Schreiber, 2001 31. Stav, 1993 32. Terzi, 2002 33. Thomas, 1991 34. Van Wieringen, 2001 35. Wheeler, 1998 36. Wheeler, 2001	dec/06	Adults with neck disorders, with or without associated headache or radicular findings.	Medicine. Medicines could be delivered by oral, intravenous, intramuscular, intra-articular, sub-cutaneous or intrathecal routes and classed as analgetics, anaesthetics, non-steroidal anti-inflammatoiries, muscle relexants, opoids, corticosteroids, or botulinum toxin.	control treatment or another treatment. Contraol treatments included: placebo control, active control (e.g. analgetics plus ultrasound versus unltrasound), inactive treatment control (e.g. analgetics plus sham TENS versus sham TENS and wait list control, or no treatment.	pain, measures of performance such as function, disability related to neck pain, work related disability, work status, quality of life, patient global perceived effect, patient satisfaction, ROM of the cervical spine.	Assessment of all Trials versus Varied Comparison: effect size was not estimable. Meta analysis of Injections: intramuscular: - Pain intensity: botox-A vs placebo at short term follow-up ES: -0,06 [-0,45, 0,32] botox-A vs placebo at intermediate term ES: 0,08 [-0,61, 0,78] Comparison I assessment of all trials vs Varied comparison for pain intensity. [the following results favour treatment] psychotropic: oral: Salzmann, 1993 -1,22 [-2,20, -0,25] Injection: intra-muscular (local anesthetic): Esenyel, 2000 -1,36 [-1,93, -0,08] Hong, 1994 -3,46 [-4,48, -2,45] Injection: nerve block: Terzi, 2002 -3,60 [-5,12, -2,07] Injections: epidural: Stav, 1993 -1,46 [-2,16, -0,76] Muscle relaxant: oral: Bose, 1999 0,68 [0,52, 0,90] Comparison I assessment of all trials vs Varied comparison for function/disability.	Lidocaine injections into myofascial tri-igger points appears effective in two trials. There is moderate evidence that botulinum toxin A is not superior to saline injection for chronic MND. There is unclear evidence for oral psychotropic agents. Based on limited numbers of studies providing advice on NSAIDs and analgetics it is not possible to draw conclusions.
Sarig-Bahat H: Evidence for exercise therapy in mechanical neck disorders. Man Ther 2003, 8(1):10-20.	medium (6)	2003	Present existing evidence for the use of exercise therapy in the management of mechanical neck disorder, and to determine which exercise methods are effective in treating the various mechanical neck disorders.	1. Bronfort, 2001 2. Kamwendo and Linton, 1991 3. Vasseljen, 1995 4. Friedrich, 1996 5. Rosenfield, 2000 6. Taimela, 2000 7. jordan, 1998 8. Takala, 1994 9. Levoska and Keinanen-Kiukaanniemi, 1993 10. McKinney, 1989 11. Söderlund, 2000 12. Wailing, 2000 13. Randlov, 1998 14. Revel, 1994 15. Hanten, 1997 16. Fitz-Ritson, 1995	Oct/2001	adults (>18 years) with mechanical disorders.	various types of active exercises (e.g. stretching, strengthening, endurance or aerobic training, postural correction, neuromuscular control and movement awareness. Phasic, isometric, isotonic or isokinetic exercise were also included.)	compared to placebo or control, or comparison between two or more interventions if one of them was exercise.	pain relief, function/disability	effect of proprioceptive exercises (favouring treatment) Taimela, 2000 For pain p<0,01-0,003 favouring prop. ex. No signicant difference is found for function. Revel, 1994 difference between mean head relocation ability before and after treatement was highly significant (p=0,0004) for the intervetnion group. And no effect for the control group. Neck pain decreased in both groups, but improvement in de intervention group was significantly greater. Small but significantly greater improvement in rotation ROM in intervention group compared with the control group.	For chronic or frequent neck pain one may consider the use of proprioceptive or dynamic strengthening exercises, based on relatively strong evidence. Evidence identified cannot support the use of group exercise, neck schools or single sessions of extension-retraction exercises.

Sarigiovannis, P. and B. Hollins (2005). "Effectiveness of manual therapy in the treatment of non-specific neck pain: a review." Physical Therapy Reviews 10(1): 35-50.	high (7)	2005	To assess the effectiveness of spinal manual therapy(manipulation and mobilisation) in the treatment of non-specific neck pain.	1. Bronfort, 2001 2. Evans, 2002 3. Hoving, 2002 4. Hurwitz, 2002 5. Yurkiw&Mior, 1996 6. Wood, 2001 7. Pikula, 1999 8. Jordan, 1998 9. Parkin-Smith&Penter, 1998 10. Nordemar&Thörner, 1981 11. Moodley&Brantingham, 1999 12. Vernon, 1990 13. Brodin, 1985	apr/03	patients suffering from non-specific neck pain	manual therapy (cervical manipulation and/or mobilisation)	compared to different treatment modalities: eg compared to another treatment, sham treatment, ...	level of pain, cervical spine mobility, global measurement of improvement, use of drugs and medical services of functional status.	unclear	it was interesting to note the weight of evidence in support of spinal manipulation therapy when used together with exercises, particularly in the treatment of patients suffering from chronic non-specific neck pain.
Shields, N., J. Capper, et al. (2006). "Are cervical pillows effective in reducing neck pain? [with consumer summary]." New Zealand Journal of Physiotherapy 34(1): 3-9.	high (7)	2006	To investigate the effct of cervical pillows on acute or chronic neck pain.	1. Burns, 1999 2. Erfanian, 2004 3. Hagino, 1998 4. Jochems, 1997 5. Lavin, 1997	May/2005	Patients (no age restriction) having acute or chronic neck pain. (the neck pain was a result of a systematic disease for example rheumatoid arthritis.)	cervical pillow	travel or ordinary pillow	pain	Results which favor treatment: Repeated measures designed trial: Hagino, 1998 (align right pillow) 0,67 [0,28-1,06] Comparative trials (two treatment pillows): Burns, 1999 Purity health vs travel pillow 0,99 [0,06-1,92] Lavin, 1997 Mediflow water vs cervi-garde roll pillow 0,48 [0,04-0,92] Controlled trials (neck support vs usual pillow) Lavin, 1997 Mediflow water vs usual pillow 0,60 [0,16-1,14]	There is insufficient evidence to conclude if cervical pillows can reduce chronic neck pain. Further studies are required.
Trinh K, Graham N, Gross A, Goldsmith C, Wang E, Cameron I, Kay T: Acupuncture for neck disorders. Volume 32. 2007:236-243.	high (8)	2006	To summarize the most current scientific evidence on the effectiveness of acupuncture for acute, subacute and chronic neck pain.	1. Birch, 1998 2. Coan, 1982 3. David, 1998 4. Irnich, 2001 5. Irnich, 2002 6. Loy, 1983 7. Petrie, 1983 8. Petrie, 1986 9. White, 2000 10. White, 2004	feb/06	adults >18years or older with the following neck disorders: MND: mechanical neck disorders, including WAD I-II, myofascial neck pain, and degenerative changes NDH: Neck disorders with headache NDR: Neck disorders with radicular symptoms	acupuncture techniques involving inserting of needles.	sham acupuncture, wait-list control, active treatment control (e.g. ultrasound), or inactive treatment control (e.g. sham TENS)	pain relief, Numerical Rating scale, disability or functional measures (e.g. NDI), activity of daily living, patient satisfaction and global perceived effect.	NNT and treatment benefit: control: NNT treatment benefit % -Sham acupuncture Birch, 1998 5 29,8% White, 2000 (MS) 3 29% White, 2000 (ESNS) 3 25% -Inactive treatment Irnich, 2002 2 37,5% Petrie, 1983 2 85,9% Irnich, 2001 13 13,5% Petrie, 1986 17 -10,6% White, 2004 12 15,6% -Wait-list control Coan, 1982 3 40,6%	For mechanical neck disorders there is moderate evidence that acupuncture is more effective than some types of sham controls for pain relief, measured at the end of the treatment. There is also moderate evidence that acupuncture is more effective than inactive treatment for pain relief, measured at the end of the treatment; this effect is still seen at short-term follow-up. Acupuncture treatments appear to be relatively safe.

Vernon, H. and B. K. Humphreys (2007). "Manual therapy for neck pain: an overview of randomized clinical trials and systematic reviews." Europa MedicoPhysica [Mediterraneal Journal of Physical and Rehabilitation Medicine] 43(1): 91-118.	high (8)	2007	To present a broad overview of the topic with a distinctive approach emphasizing the analysis of changes scores in the clinical trials.	1. Brodin, 1985 2. David, 1998 3. Hurwitz, 2002 4. Hoving, 2002 5. Korthals-de-Bos, 2003 6. Hemmila, 2005 7. Gam, 1998 8. Irnich, 2001 9. Cen, 2003 10. Norderman and Thorner, 1981 11. Howe, 1983 12. Pikula, 1999 13. Jordan, 1998 14. Giles and Muller, 1999, 2003 15. Bronfort, 2001 16. Evans, 2002 17. Rogers, 1997 18. Parkin-Smith and penter, 1998 19. van Schalwyk and Parkin-Smith, 2000 20. Wood, 2001 21. Moretti, 2004 22. Palmgren, 2006	nov/06	adults (18-50) with nonspecific neck pain -acute neck pain - chronic neck pain	manual therapy	comparative treatments	pain, impairment		the evidence reviewed provides for the contention that MT which induce joint mobility-manipulation and mobilisation-are effective in the treatment of neck pain, especially chronic neck pain. The evidence reviewed here does not yet support the contention that massage therapy is similarly effective in those subjects randomized to receive it.
Vernon, H. T., B. K. Humphreys, et al. (2005). "A systematic review of conservative treatments for acute neck pain not due to whiplash." Journal of Manipulative and Physiological Therapeutics 28(6): 443-448.	medium (5)	2005	To identify the evidence base of clinical trials of conservative treatments for acute neck pain not due to whiplash injury	1. Nordermar and Thorner, 1981 2. Howe, 1983 3. Ekberg, 1994 4. Pikula, 1999	aug/03	acute mechanical neck pain in adults not due to whiplash	conservative or complementary therapy	control intervention, comparative treatments	pain, ROM		The quality scores for all 4 trials were in the fair-to-medium range. None scored above 60%. Therefore, none of these studies can be said to provide convincing evidence for their findings. Two trials provided limited evidence of the immediate benefit of a spinal manipulation. One trial provides some evidence that TENS treatment is beneficial over a 3-week interval.
Vernon, H., K. Humphreys, et al. (2007). "Chronic mechanical neck pain in adults treated by manual therapy: a systematic review of change scores in randomized clinical trials." Journal of Manipulative and Physiological Therapeutics 30(3): 215-227.	medium (6)	2007	A systematic analysis of group change scores in RCTs of chronic neck pain not due to whiplash and not including headache or arm pain treated with manual therapy.	1. Rogers, 1997 2. Parkin-Smith and Penter, 1998 3. Jordan, 1998 4. Giles and Muller, 1999, 2003 5. Wood, 2001 6. Bronfort, 2001 7. Evans, 2002 8. Hurwitz, 2002 9. Brodin, 1985 10. Hoving, 2002 11. Korthals-de Bos, 2003 12. Gam, 1998 13. Irnich, 2001	dec/05	adults 18-50 with chronic mechanical neck pain.	Manual therapy	Compared group could be: -ultrasound, massage, exercises, -control -acupuncture -sham laser acupuncture -stretching -general practicer -physiotherapy (mostly exercises) -medical care -maniplation with or without heat, with or without ES -daily aspirin+neck school	pain	Change scores and effect size for studies of manipulation: outcome interval mm-change % change Effect size 0-6wk 20,6 58,2 1,63(1.13-2.13) 7-12 wk 22 56 1,56(0.73-2.39) >12wk 22 50 1,22(0.38-2.06) Mobilisation trials: change scores: Study Outcome point (wk) Result Brodin 4 78,3% with>2 point reduction David 6 ES=2,5 Hurwitz 2,6,13,24 NS difference mobvs man Hoving 7 Full recovery=63% of subjects Korthals-de Bos 13, 52 Full recovery=71,7% of subjects	There is moderate to high-quality evidence that subjects with chronic neck pain not due to whiplash and without arm pain and headaches who are randomized to receive a course of spinal manipulation or mobilisation show clinically imporant improvements at 6,12 and up to 104 weeks posttreatment.

APPENDIX 4: EVIDENCE TABLE OF INCLUDED RCT'S FOR TREATMENT

	Reference	Cochrane code medium (4,5,6) or high (>6) max=9	Publication date	Objective	Patient	Intervention	Compare	Outcome	Data-extraction	Authors conclusion
1	Helewa, A., et al., Effect of therapeutic exercise and sleeping neck support on patients with chronic neck pain: a randomized clinical trial. J Rheumatol, 2007. 34(1): p. 151-8.	high (7)	2007	To inverstigate the effect of therapeutic exercises and sleeping neck support contoured pillows on patients with chronic neck pain.	adults 18-70 years with unresolved neck pain (between 2 -12 months duration) n=151 participants and n=128 who completed the 12-week assessment	treatment maneuvers were provided by a physiotherapist assigned to the study. 1. Thermal modalities and massage 2. Neck support 3. Active exercises	1. Active control: heat or cold plus superficial massage 2. Control + instruction in using a sleeping neck support pillow(prvided) 3. Control + active neck and postural exercises 4. Control + a neck support pillow + active neck and postural exercises	* The northwick Park Neck Pain Questionnaire * SF-36 Health Status Survey (acute) * Physical measures: grip strength, anterior neck muscle strength with modified sphygmomanometer. VAS for recording pain.		The results indicate that subjects with chronic neck pain should be treated by health professionals trained to teach both exercises and the appropriate use of a neck support pillow during sleep; either strategy alone will not give the desired clinical benefit.
2	O'Leary, S., et al., Specific therapeutic exercise of the neck induces immediate local hypoalgesia. J Pain, 2007. 8(11): p. 832-9.	high (7)	2007	To compare two specific cervical flexor muscle exercise protocols on immediate pain relief in the cervical spine of people with chronic neck pain.	n=48 females with a history of neck pain of 3 or more months' duration and scored 5 or greater on the NDI (Neck Disability Index).	* Cranio-cervical flexion co-ordination exercise (CCF) * Cervical Flexion endurance exercise (CF)	* Cranio-cervical flexion co-ordination exercise (CCF) * Cervical Flexion endurance exercise (CF)	* pain (with VAS and pressure pain treshold (PPT) with the Somedic Production, Stockholm, Sweden) * SNS (sympathetic nervous system) measures (skin conductance, blood flow, skin tempertaure and blood pressure).	PPT (kPa) difference between pre- and post-intervention CCF 21,93 (11,34 to 32,51)* CF 8,01 (0,74 to 15,27)* *significant within-group change pre-post exercise intervention (p<0,05) Significance is found btween-group interaction pre-post intervention of p=0,03	For clinicians treating patients with painful cervical spine disorders, the findings of this study offer some support for the prescription of therapeutic exercise as an immediate pain-relieving strategy. Resutls suggest that specific CCF exercise can be prescribed with the intention of providing immediate reduction of pain. Patients may find exercise of this nature an effective pain relieving modality potentially as a substutute for, or as a conjunct therapy to, other self-applied pain relieving modalities such as medication or heat.
3	Ylinen, J., et al., Neck muscle training in the treatment of chronic neck pain: a three-year follow-up study. Eura Medicophys, 2007. 43(2): p. 161-9.	high (7)	2007	To evaluate whether the positive results achieved with a one-year training regimen in patients with chronic non-specific neck pain would have long-standing effects.	n=180 females included of which 5 withdrew for personal reasons, polymyalgia rheumatica or pregnancy. All were employed female office workers of working age with neck pain for over 6 months.	1. strength exercises group (12 days) 2. endurance exercises group (12 days)	The groups were compared with each other and with a control group (3 days)	pain and disability		The decrease in pain and disability was found to remain at the 3-year follow-up. Also, functional improvements were sustained despite the decline in training compliance after the first year. Active neck muscle training can be recommended for patients suffering friom chronic non-specific neck pain, and the importance of maintaining compliance up to one year should be emphasised, but specific training is not necessarily a lifelong procedure to eradicate chronic neck pain.

4	Cleland, J.A., et al., Short-term effects of thrust versus nonthrust mobilization/manipulation directed at the thoracic spine in patients with neck pain: a randomized clinical trial. Phys Ther, 2007. 87(4): p. 431-40.	high (7)	2007	The main purpose of this study was to compare the short-term effectiveness of thrust mobilization/manipulation directed at the thoracic spine in patients with mechanical neck pain.	n=60 patients between 18-60 years of age and had a primary complaint of neck pain	nonthrust mobilization/manipulation thrust mobilization/manipulation	thrust mobilization/manipulation nonthrust mobilization/manipulation	Level of disability NDI secondary outcomes: pain and global rating og change	Subjects receiving thrust mobilization/manipulation experienced greater reduction in disability, with a between-group difference of 10% (95% CI=5,3-14,7), and pain, with a between-group difference of 2% (95% CI=1,4-2,7). Subjects in the thrust mobilization/manipulation group exhibited significantly (p<0,01) higher scores on the GROC Scale at the time of follow-up, with a mean difference between the groups of 1,5 points (95% CI= 0,48-2,5).	The results suggest that thoracic spine thrust mobilization/manipulation results in significantly greater short-term reducitons in pain and disability than does thoracic nonthrust mobilization/manipulation in people with neck pain.
5	Hakkinen, A., et al., Strength training and stretching versus stretching only in the treatment of patients with chronic neck pain: a randomized one-year follow-up study. Clin Rehabil, 2008. 22(7): p. 592-600.	high (7)	2008	To compare the effectiveness of a 12-month home based combined strength training and stretching programme against stretching alone in the treatment of chronic neck pain.	n=101 age 25-53 and a duration of non-specific neck pain for more than 6 months	stretching strength training and stretching	strength training and stretching stretching	pain, disability, neck muscle strength and mobility of cervical spine	pain decrease (no sign differernce between the groups): baseline 12 months strength and stretch group 64mm (17) 27 mm (34-20) stretch group 60mm (17) 32 mm (35-22)	No significant difference in neck pain and disability were observed between the two home-based training regimes. Combined strength training and stretching or stretching only were probably as effective in achieving a long-term improvement although the training adherence was rather low most of the time.
6	Hakkinen, A., et al., Effect of manual therapy and stretching on neck muscle strength and mobility in chronic neck pain. J Rehabil Med, 2007. 39(7): p. 575-9.	high (7)	2007	To study the effect of manual therapy and stretching on neck function in women with chronic neck pain.	n=125 age 25-53 permantely employed and neck pain lasting more than 6 months	manual therapy stretching	stretching manual therapy(mobilization and massage and passive stretching)	pain, neck strength, ROM	both neck muscle strength (11-14%) and mobility (7-15%) improved similarly in both groups, with the exeption of greater passive flexion-extension mobility (p=0,019). Pain during the neck strength trials decreased from the baseline to week 4 by 26-35%) and this similar in both groups.	Both manual therapy and stretching were effective short term treatments for reducing both spontaneous and strain-evoked pain in patients with chronic neck pain.
7	Itoh, K., et al., Randomised trial of trigger point acupuncture compared with other acupuncture for treatment of chronic neck pain. Complement Ther Med, 2007. 15(3): p. 172-9.	high (8)	2007	The main aim in this study was to determine if acupuncture at trigger points is an effective treatment for chronic neck pain, when compared to existing, widely used acupuncture at standard acupuncture points.	n=40 patients above 45 years of age with a history of non-specific neck pain of 6 months or longer.	Standard acupuncture Trigger point acupuncture Non-trigger point acupuncture Sham acupuncture	Standard acupuncture Trigger point acupuncture Non-trigger point acupuncture Sham acupuncture	pain intensity VAS pain disability with NDI	Triggerpoint group VAS score baseline = 67±13,2mm and after 3 weeks treatment 18,6±18,5mm (p<0,01) Triggerpoint group NDI score baseline = 13,0±6,3 and after 3 weeks treatment 3,9±3,4 (p<0,01)	These results suggest that triggerpoint acupuncture therapy may be more effective on chronic neck pain in aged patients than the standard acupuncture therapy.

8	Vas, J., et al., Efficacy and safety of acupuncture for chronic uncomplicated neck pain: a randomised controlled study. Pain, 2006. 126(1-3): p. 245-55.	high (7)	2006	To evaluate the efficacy and safety of acupuncture in comparison with transcutaneous nerve stimulation-placebo (TENS-placebo) for the treatment of chronic uncomplicated neck pain with a duration exeeding three months.	n=123 with a drop out of 8 participants because of personal reasons, fear for acupuncture, cointervention or pregnancy. All were aged 17 and over; all were diagnosed with uncomplicated neck pain of over three monts duration, symptomatic at the time of examination, with a motion-related neck pain intensity equal to or exeeding 30 on a VAS and who had not received any treatment during the week preceding their incorporation into the study.	Acupuncture	TENS-placebo	pain on VAS secondary outcomes: Northwick Park neck pain questionnaire	Baseline to treatment changes in pain-VAS: acupuncture group 44,1 (SD 19,5) and control group 12,3 (SD 14,6) (p<0,001)	In the treatment of the intensity of chronic neck pain, acupuncture is more effective than the placebo treatment and has a safety pattern that makes it suitable for standard clinical practice.
9	Willich, S.N., et al., Cost-effectiveness of acupuncture treatment in patients with chronic neck pain. Pain, 2006. 125(1-2): p. 107-13.	medium (5)	2006	The objective of this study was to assess costs and cost-effectiveness of additional acupuncture treatment in patients with chronic neck pain compared to patients receiving routine care alone.	n=3.451 (1.753 patients receiving acupuncture and 1.698 control)	Calculation of costs for the acupuncture group	calculation of costs for the control group	neck pain and disability	The ICER was between €12.469 (overall) per Qualy gained and €13.618 (diagnostic-specific) per Qualy gained. When adopting a treshold of €50.000 per Qualy gained, acupuncture is addition to routine care is, therefore, cost-effective.	The results show that treating patients with chronic neck pain with acupuncture in addition to routine resulted in a marked clinical relevant benefit and was relatively cost-effective. Acupuncture should be considered a viable option in the medical care of patients with chronic neck pain.
10	Ma, K., et al., The efficacy of oxycodone for management of acute pain episodes in chronic neck pain patients. Int J Clin Pract, 2008. 62(2): p. 241-7.	medium (6)	2008	The aim of this study is to evaluate the efficacy and side effects of oxycodone controlled release (Oxy-CR) in managing chronic neck pain with acute episodes.	n=116 patients (between 40-70 years of age and over 40 kg of body weight) with acute chronic neck pain flares	Oxycodone (if VAS 4-6: 5mg every 12h if VAS 7-10: 10 mg every 12h)	Placebo (placebo tablet every 12h)	the frequency of patients' pain episodes VAS Quality of life Quality of sleep side effects ==> all recorded at days 1, 3, 7, 14, 21 and 28	Frequency of acute flare pain: (p<0,05) Oxy-group placebo group pre post pre post at 3 days 58 33 58 40 at 7 days 58 12 58 26 VAS Oxy-group pre p<0,05) Oxy-group post at day 3 6,82±1,83 (n=58) 3,35±1,57 (n=58) at day 7 6,82±1,83 (n=58) 3,24±0,92 (n=58) Quality of Life for Oxy-group p<0,05 at baseline at the end physical functioning 42,26±11,25 56,69±12,26 Pain index 41,72±9,78	Oxy-CR demonstrated a quick and good analgestic effect on acute episodes of chronic neck pain and improved patients' QOL with a minimal and tolerable side effects. It could be an important optional drug for the management of refractory chronic neck pain with frequent acute episodes in the patient who failed to respond to non-opioid conservative management.

11	Bernaards, C.M., et al., Improving work style behavior in computer workers with neck and upper limb symptoms. J Occup Rehabil, 2008. 18(1): p. 87-101.	high (7)	2008	The goal of this study was to assess the effectiveness of a group-based interactive work style intervention in improving work style behavior.	n=466 computer workers	work style work style and physical activity	work style work style and physical activity	Body posture and workstation adjustment Use of breaks and exercise reminder software work stress measured on T1= 6 months and T2 12 months.		A group based work style intervention seems so be effective in improving some elements of work style behavior. Future studies should investigate the effectiveness of work style interventions on all dimensions of the Fuerstein work style model.
12	Voerman, G.E., et al., Effects of ambulant myofeedback training and ergonomic counselling in female computer workers with work-related neck-shoulder complaints: a randomized controlled trial. J Occup Rehabil, 2007. 17(1): p. 137-52.	medium (6)	2007	To investigate the effect of ambulant myofeedback training, including ergonomic counseling and ergonomic counseling alone on work related neck-shoulder pain and disability.	n= 79 participants from Sweden and the Netherlands	Intervetnions are prvided by one physiotherapist in Sweden and two health scientists in the Netherlands. ergonomic counseling (EC) myofeedback (Mfb) (Hannes and processing/storage unit	EC and Mfb groups comparison	Pain and disability	Pain intensity in the neck-shoulder region significantly changed over time (F=12,08, p<0,01), without additional effects for the type of the intervention (F=1,54, p=0,22), study group (F=0,48, p=0,49), or interaction effects (F≤0,87, p≥0,35). Disability levels significantly changed over time (F=17,68, p<0,01) and were significantly different between the two study groups (i.e. Sweden and the Netherlands) (F=5,30, p=0,02). No additional effects were found for intervention type (F=0,86, p=0,35) nor the interaction terms (F≤1,97, p≥0,12).	Myofeedback training combined with ergonomic counseling is beneficial for female computer workers over the age of 45, reporting pain and disability in the neck-shoulder region, but no evidence was found favouring myofeedback training combined with ergonomic counselling over ergonomic counsling alone.
13	Brockow, T., et al., Analgesic effectiveness of subcutaneous carbon-dioxide insufflations as an adjunct treatment in patients with non-specific neck or low back pain. Complement Ther Med, 2001. 9(2): p. 68-76.	high (9)	2007	To evaluate wether patients with acute non specific neck pain get pain free sooner, if treated with subcutaneous carbon dioxide insufflations compared to sham ultrasound.	n=126 patients with non-specific neck pain<65 years	Subcutaneous carbon dioxide insufflations (SCI) between 25 and 100ml) + local infrares light	sham ultrasound + local infrares light	neck pain relief secondary: pain intensity, affective pain, sensory pain, treatmet failure, recurrence of neck pain	43% of the patients (27/63) assigned to SCI experienced neck pain relief during the 28-days follow-up compared to 46% (29/63) assigned to sham ultrasound. No signifcant difference is found btween the groups.	The results of the study indicates that SCI are not superior to sham ultrasound for treating patients with acute non-specific neck pain.

APPENDIX 5: EVIDENCE TABLE OF INCLUDED PUBLICATIONS DIAGNOSIS AND PROGNOSIS

Reference	cochrane code medium (4,5) or high (>6) max=7 or Quadas code medium (7 -9) or high (>10) max=14	date of publication	objective	included studies	last search	patients	intervention	outcome	extraction data/ results	conclusion of the author
Bjorksten, M.G., et al., The validity of reported musculoskeletal problems. A study of questionnaire answers in relation to diagnosed disorders and perception of pain. Applied Ergonomics, 1999. 30(4): p. 325-330.	high (12 on Quadas)	1999	To evaluate the validity of answers given in a questionnaire on musculoskeletal pain and conditions by means of a clinical assessment, and to get some understanding of the subject's perception of reported pain.	Not relevant for this study.	Not relevant for this study.	n=171	questionnaire Clinical assessment VAS and pain drawings	sensitivity and specificity data from the questionnaires and the clinical diagnosis	sensitivity and specificity of questionnaire concerning musculoskeletal pain/ailments of the neck/shoulders the last 3 months, the last 7 days and currently, compared with a clinical examination. 3 m sens. spec. / 7m sens. spec. / currently sens. spec. Neck/shoulders 100 22 / 97 41 / 95 88 Predictive value for current pain is 68,9%.	The results of this study confirm the validity of the subjective reports of the respondents. A 'pain assessment instrument' including a questionnaire, VAS and pain drawings may be useful to reveal conditions in the neck and the shoulders and thoracic spine, common sites of work related musculoskeletal disorders.
De Hertogh, W.J., et al., The clinical examination of neck pain patients: The validity of a group of tests. Manual Therapy, 2007. 12(1): p. 50-55.	high (10 on Quadas)	2007	To evaluate wether a blinded observer could identify the neck pain patients in a sample of 42 subjects consisting of neck pain patients and asymptomatic controls.		Not relevant for this study.	n=42	Bournemouth questionnaire (BQ) Visual Analogue Scale (VAS) Manual examination procedures (rotation C0-2-7, rated range of motion, end feel, onset of pain) Spurling test Cervical Range of Motion Device	senitivity and specificity of the tests	VAS and BQ had 77,5% correct allocations and a high specificity of 90,9%. The manual examination procedures have similar results. The combination of the VAS score, BQ and mEPs resulted in a sensitivity and specificity of 100% and 86,4%, respectively. Exept for the flexion movement all CROM allocation percentages are around 50%.	The findings reinforce the validity of MEPs. Clustering pain measurements, BQ and MEPs provides the highest diagnostic value to identify neck pain patients or necks in need of treatment.
Rubinstein, S.M., et al., A systematic review of the diagnostic accuracy of provocative tests of the neck for diagnosing cervical radiculopathy. European Spine Journal, 2007. 16(3): p. 307-319.	high (7 on Cochrane)	2007	A systematic review in order to assess the diagnostic accuracy of clinical provocative tests of the neck.	1. Davidson, 1981 USA 2. Quinter, 1989 Australia 3. Shah, 2004 India 4. Tong, 2002 USA 5. Viikari-Juntura, 1989 Finland 6. Wainner, 2003 USA	is not reported	all studies together n=693	Clinical provocative tests of the neck	Diagnostic accuracy of the tests	Spurling's test demonstrated low to moderate sensitivity and specificity, as did individual studies for traction/neck distraction and the Vasalva's manoeuvre. On the other hand the two studies which investigated the ULTT demonstrated high sensitivity and low specificity , while the three studies for the shoulder abduciton test demonstrated low to moderate sensitivity and moderate to high specificity.	A positive Spurling's test, traction/neck distraction, and Vasalvas manoeuvre might be indicative of a cervical radiculopathy, while a negative ULTT might be used to rule it out. However, the lack of evidence precludes any firm conclusions rgarding their diagnostic value, especially when used in primary care. More high quality studies are necessary in order to resolve this issue.

Rubinstein, S.M. and M. van Tulder, A best-evidence review of diagnostic procedures for neck and low-back pain. Best Practice and Research: Clinical Rheumatology, 2008. 22(3): p. 471-482.	medium (4 on cochrane)	2008	The aim is to present an overview of the best available evidence on diagnostic procedures for neck and low-back pain.		up until 2007	not reported	diagnostic procedures	valid procedures		There is sufficient sound evidence from systematic reviews to make the following recommendations: * the history is principally for triage, during which 'red flags' should be identified * the presence of multiple red flags should raise clinical suspicion and indicates the need for further investigation * the physical examination is used to confirm suspision from history: - in the case of cervical radiculopathy, tests such as Spurling's can be used to make the diagnosis, while others , such as the upper limb tension test, can be used to rule it out * in patients older or 50 years of age, plain spinal radiography together with standard laboratory tests are highly accurate in identifying underlying systematic disease; however, plain spinal radiography is not a valuable tool for non-specific neck pain * there is strong evidence for the diagnostic accuracy of facet joint blocks in evaluating spinal pain, and moderate
Sehgal, N., et al., Systematic review of diagnostic utility of facet (Zygapophysial) joint injections in chronic spinal pain: An update. Pain Physician, 2007. 10(1): p. 213-228.	high (6 on cochrane)	2007	To evaluate and update available evidence (2004 to 2006) relating to clinical utility of facet joint injections (intraarticular and medial brach blocks) in diagnosing chronic spinal pain of facet joint origin	publications for cervical region: 1. Barnsley, 1993 and 1995 2. Lord, 1996 3. Manchikanti, 2002a+b, 2004 4. Manchukonda, 2007 5. Speldewinde, 2001	dec/06	n= 1002	controlled diagnostic blocks	prevelance and false-positive rate	All studies had a prevalence between 36 and 67% (from one study no data were available) The false-positive rate was between 27% and 63% (from 3 studies no data were available)	The evidence obtained from the literature review suggests that controlled comparative local anesthetic blocks of facet joints (medial branch or dorsal ramus) are reproducable, reonably accurate and safe.
Vos, C.J., A.P. Verhagen, and B.W. Koes, The Ability of the Acute Low Back Pain Screening Questionnaire to Predict Sick Leave in Patients With Acute Neck Pain. Journal of Manipulative and Physiological Therapeutics, 2009. 32(3): p. 178-183.	high (10 Quadas)	2009	The aim of this study was to investigate the use of the Acute Low Back Pain Screening Questionnaire (ALBPSQ) in patients with acute neck pain in general practice.			n=180	The Acute Low Back Pain Screening Questionnaire (ALBPSQ)	reliability of the questionnaire and sick leave	ICC of the total scores on the ALBPSQ of the stable group was 0,85 (95% CI, 0,73-0,92) A cutoff score of 72 at baseline identified patients with or without long-term sick leave with a sensitivity of 77% and a specificity of 62%.	In this prospective cohort study, in general practice, the ALBPSQ was shown to be a reliable instrument and to be able to screen patients with neck pain that may be at risk for prolonged sick leave.

APPENDIX 6: RECOMMENDATIONS COMPARED TO EXISTING GUIDELINES

AANBEVELING - KLINISCHE VRAGEN		De op basis van AGREE geselecteerde richtlijnen:																			
		Aanbeveling 1					Aanbeveling 2					Aanbeveling 3					Aanbeveling 4				
		Kernboodschappen	Evidentieniveau *			Boodschap adapteren? (ja / neen)	Kernboodschappen	Evidentieniveau *			Boodschap adapteren? (ja / neen)	Kernboodschappen	Evidentieniveau *			Boodschap adapteren? (ja / neen)	Kernboodschappen	Evidentieniveau *			
			Guideline CKS	Guideline BMJ	GRADE			Guideline CKS	Guideline BMJ	GRADE			Guideline CKS	Guideline BMJ	GRADE			Guideline CKS	Guideline BMJ	GRADE	
I	Diagnostiek - approach																				
1	How do you assess someone with neck pain?	Exclude "red flags" , serious spinal pathology or nerve root pain (radiculopathy) and possible facet joint spinal pain.	**How do I assess someone with neck pain?** * Exclude non-musculoskeletal causes, such as cardiovascular, respiratory, and oesophageal diseases, and acute upper respiratory tract infection and sore throat. * Look for 'red flags' (that suggest a serious spinal abnormality). If present, refer urgently for investigations and further assessment. * If the neck pain and other symptoms follow recent sudden or excessive hyperextension, flexion, or rotation of the neck, see CKS topic on Neck pain-whiplash injury. * If the neck pain is due to acute spasm with no obvious underlying cause, see the CKs topic on Neck pain- acute torticollis. * If the neck varies with different physical activities and with time, or is related to an awkward movement, poor posture, or overuse, suspect non-specific neck pain. * If there is unilateral neck, shoulder, or arm pain that aproximates to a dermatome, suspect cervical radiculopathy, see the CKS topic on Neck Pain-cervical radiculopathy. there may be altered sensation or numbness, or weakness in related muscles. However, the presence of pain or parasthesia radiating into the arm is not specific for nerve root pain and may be present in people with non-specific neck pain. * Identify risk factors for developing neck pain: 1) workplace associated risks (awkward neck postures, neck flexion, arm force, arm posture, duration of sitting, twisting or bending of the trunk, had-arm vibration, and some workplace designs.) 2) excessive use of pillows. * Identify psychosocial factors that may indicate increased risk for chronicity and disability. Identify any excessive concerns about the neck pain, unrealistic expectations of treatment, disbling sickness behaviour, and problems with compensation, work, family, mood and emotions. * Cervical X-rays and other imaging studies and investigations are not routinely required to diagnose or assess neck pain with radiculopathy and non-specific neck pain.				Older age and cocomitant low back pain are indicators of a less favourable prognosis of neck pain. Radiological findings are not associated with worse diagnosis, but the severity of pain and a history of previous attacks however seem to be associated with worse diagnosis. The 'Acute Low Back Pain Screening instrument' seems to be a reliable instrument in screening patients with non-specific neck pain at risk for prolonged sick leave.	**How do I assess someone with neck pain?** * Exclude non-musculoskeletal causes, such as cardiovascular, respiratory, and oesophageal diseases, and acute upper respiratory tract infection and sore throat. * Look for 'red flags' (that suggest a serious spinal abnormality). If present, refer urgently for investigations and further assessment. * If the neck pain and other symptoms follow recent sudden or excessive hyperextension, flexion, or rotation of the neck, see CKS topic on Neck pain-whiplash injury. * If the neck pain is due to acute spasm with no obvious underlying cause, see the CKs topic on Neck pain-acute torticollis. * If the neck varies with different physical activities and with time, or is related to an awkward movement, poor posture, or overuse, suspect non-specific neck pain. * If there is unilateral neck, shoulder, or arm pain that aproximates to a dermatome, suspect cervical radiculopathy, see the CKS topic on Neck Pain-cervical radiculopathy. there may be altered sensation or numbness, or weakness in related muscles. However, the presence of pain or parasthesia radiating into the arm is not specific for nerve root pain and may be present in people with non-specific neck pain. * Identify risk factors for developing neck pain: 1) workplace associated risks (awkward neck postures, neck flexion, arm force, arm posture, duration of sitting, twisting or bending of the trunk, had-arm vibration, and some workplace designs.) 2) excessive use of pillows. * Identify psychosocial factors that may indicate		C C C												
2	What are the diagnostic procedures to be performed to diagnose non-specific neck pain?	• No evidence for diagnostic accuracy of history talking is found. • No evidence for diagnostic imaging for patients with non-specific neck pain is found.					• Exclude 'radiculopathy'. With combinations of the following test, radiculopathy can be confirmed or excluded: o Arguments to confirm radiculopathy : *Positive Spurling Test *Positive Traction Distraction test *Positive Vasalva manoevre *Positive Shoulder Abduction test o Arguments to exclude radiculopathy: *Negative Upper Limb Tension test.			C		Exclude facet joint spinal pain. If a working diagnose by manual examination procedures fails, than local anesthetic block can be used for proving or excluding facet joint spinal pain.			B					

3	How do you assess pain intensity and disability in patients with non-specific neck pain?	• To assess pain and disability of patient with non-specific neck pain the following instruments can be used alone or in combination: o For pain and disability: manual examination procedures (involving examination of cervical rotation, flexion and extension and the Spurling test), VAS and the Bournemouth questionnaire. o For acute pain and disability: VAS scale, pain drawings and a questionnaire. o For disability: the "Neck Disability index" is the most validated instrument for self-rated disability.			B B A																
II	Aanpak- behandeling- follow-up																				
1	Does manipulation or mobilization alone work for acute or chronic non-specific neck pain?	Manipulation or mobilization should not be the only interventions for the acute or chronic phase of NNP.	If symptoms persist from 3 or 4 weeks to 12 weeks (subacute) than refer to a physiotherapist for a multimodal treatment strategy that includes exercises and some form of manual therapy.	Mobilisation or manipulation are likely to be beneficial for non-specific neck pain.	B																
2	Does manipulation or mobilization combined with supervised exercises work for acute or chronic non-specific neck pain?	Manual therapy (involving mobilization, manipulation) combined with exercises are effective in the treatment of patients chronic NNP for pain and disability.	If symptoms persist from 3 or 4 weeks to 12 weeks (subacute) than refer to a physiotherapist for a multimodal treatment strategy that includes exercises and some form of manual therapy.	Mobilisation or manipulation are likely to be beneficial for non-specific neck pain.	A		Manipulation and mobilization combined with other modalities as advice or home exercises do not relief pain or increase disability.			C										
3	Is traction an effective intervention for non-specific neck pain?	Traction on the cervical spine is not effective for treatment of NNP.		Unknown effectiveness is found for traction on patients with non-specific neck pain.	C																
4	Is massage an effective intervention for non-specific neck pain?	Massage therapy as an isolated approach is not proven to be effective for NNP.	In the chronic phase: Continue physiotherapy if helpful, discontinue if not. Avoid passive interventions, such as massage or electrotherapy.		C																
5	Are exercises effective for the treatment of non-specific neck pain?	Exercise (supervised) can be effective for the treatment of non-specific acute and chronic neck pain.	Poor posture should be corrected if it is thought to precipitate or aggravate the neck pain.	Exercises and postural treatments are likely to be beneficial for non-specific neck pain.	B		Strengthening, stretching, proprioceptive and dynamic resisted exercises are effective for chronic NNP. o Stretching and strengthening programs focussing on the cervical or cervical and shoulder/thoracic region gives for short- and long-term benefit on pain in chronic mechanical neck disorders. o Strengthening and stretching of only the shoulder region plus general condition assists in improving function in the short term for chronic NNP.			B B C		Eye-fixation and neck proprioceptive exercises are effective for pain relief and function in the short and long term for chronic NNP. o Specific cranio-cervical flexion-exercises can be prescribed with the intention of providing an effective pain relieving modality potentially as a substitute for, or as conjunct therapy to, other self-applied pain relieving modalities such as medication or heat.			B C		Home exercises (not supervised on a continued basis) cannot be recommended for NNP. Group exercises, neck school (for heterogeneous groups of patients) or single session of extension-retraction exercises cannot be supported by evidence			C
6	Are electrotherapy modalities effective as intervention for non-specific neck pain?	Low Level laser therapy can be effective for acute and chronic NNP.	In the chronic phase: Continue physiotherapy if helpful, discontinue if not. Avoid passive interventions, such as massage or electrotherapy.		C		Benefit from TENS (transcutaneous electrical nerve stimulation) treatment for NNP is doubtful.	In the chronic phase: Continue physiotherapy if helpful, discontinue if not. Avoid passive interventions, such as massage or electrotherapy.	Unknown effectiveness is found for TENS on paitents with non-specific neck pain.	C		PEMF (pulsed electromagnetic field) can reduce pain for patients with acute or chronic NNP.	In the chronic phase: Continue physiotherapy if helpful, discontinue if not. Avoid passive interventions, such as massage or electrotherapy.	Unknown effectiveness is found for PEMF on paitents with non-specific neck pain.	C		EMS (electro muscle stimulation) has no benefit on trigger point	In the chronic phase: Continue physiotherapy if helpful, discontinue if not. Avoid passive interventions, such as massage or electrotherapy.		C
7	Are multimodal approaches effective for non-specific neck pain?	A multimodal approach of exercises (supervised) combined with mobilizations or manipulations are effective for subacute and chronic NNP.	Strong evidence favours a multimodal care approach using exercise combined with mobilization or manipulation in people with subacute or chronic neck pain.	Unknown effectiveness is found for different combinations of multimodal treatment for non-specific neck pain versus each other.	A															

8	Is a multidisciplinary approach effective for non-specific neck pain?	No recommendation could be made based upon the literature search.																			
9	Does medication work for non-specific neck pain?	There are not enough studies on any medicinal treatment to allow strong recommendation. Therefore all the following recommendations should be completed with key messages on pain therapy as found in general guidelines (American Geriatrics Society (http://www.americangeriatrics.org/), Sociéte Scientifique de Médecine Générale (http://www.ssmg.be)).	First 3-4 to 12 weeks: Offer limited courses of analgesia to relieve symptoms. Choice of analgesia depends on the severity, personal preferences, tolerability, and risk of adverse effects. Options include: paracetamol or ibuprofen taken as required, paracetamol regularly, ibuprofen taken regularly, paracetamol and ibuprofen taken regularly. Codeine taken inaddition to regular paracetamol or ibuprofen if the response to either drug is insufficient. Codeine should be prescribed separately to allow flexibility of dosing and titration of analgesic effect. Combination products, such as co-codamol, are not recommended.	Unknown effectiveness is found for drug treatments for non-specific neck pain versus each other. Note: *"We found no direct information about wether analgetics (paracetamol, opiods), NSAIDs, antidepressants, epidural corticosteroids, or epidural local anaesthetics are better than no active treatment."*	C		Some forms of medication can work taking in to account it concerns acute, subacute or chronic non-specific neck pain: o Local anaesthetics are effective in reducing chronic NNP. o An epidural injection of a corticoid plus local anaesthetic reduces pain for patients with chronic NNP. o Botulinum toxin A is no better than saline injections for chronic NNP. o Subcutaneous carbon dioxide insufflations are no better than sham ultrasound (placebo treatment) for acute NNP. o Paracetamol, (opoid) analgetics or NSAIDs on pain are beneficial, but no clear difference is found when analgetics and/or NSAIDs are compared with each other. o Chronic NNP patients with frequent acute episodes of neck pain can be treated with oxycodone.			B C B C C C										
10	Do education programs work for patients with non-specific neck pain?	Educational programs focusing on activation or on stress coping skills are not beneficial for NNP.	First 3-4 weeks: reassure the person taht neck pain is a very common problem and that symptoms are likely to resolve. Encourage the person to remain active and return to a normal lifestyle. Strongly discourage prolonged abscence from work. Advise the person noit to drive if the range of motion of the neck is restricted. From 3-4 weeks to 12 weeks: look for and address any psychosocial factors. Promote possitive attitudes to activity and work.	Unknown effectiveness is found for patient education treatment for non-specific neck pain.	B		Traditional neck schools are not beneficial for the treatment of NNP.			C		Education or counselling programmes for (female) computer workers is effective to decreasing pain intensity and disability decrease.			B					
11	Are pillows effective in the treatment of non-specific neck pain?	The combination of exercises and a neck pillow is effective to reduce pain for patients with chronic NNP.	During the first 3-4 weeks: A firm pillow may provide comfort at night.	Unknown effectiveness is found for pillows for non-specific neck pain.	C																
12	Is the use of collars, oral splints effective for patients with non-specific neck pain?	There is no benefit for the use of soft collars or oral splints for patients with NNP.	Discourage the person from wearing a cervical collar; Neck supports, if used, should be worn for as short a time as possible (2-4 days) and under supervision (e.g. by a physiotherapist), to ensure that mobilization is started as soon as possible.	Unknown effectiveness is found for soft collars for non-specific neck pain.	B																
13	Does acupuncture have a positive effect on treatment of non-specific neck pain?	Acupuncture and more specifically trigger point acupuncture can improve pain relief for non-specific chronic neck pain and is relatively cost-effective.	From 3-4 to 12 weeks: consider referral for acupuncture.	Acupuncure is likely to be beneficial for the treatment of non-specific neck pain.	B																

APPENDIX 7 : NECK DISABILITY INDEX

ORIGINAL VERSION NECK DISABILITY INDEX: INSTRUMENT AND INTERPRETATION

Neck Disability Index

This questionnaire has been designed to give us information as to how your neck pain has affected your ability to manage in everyday life. Please answer every section and **mark in each section only the one box that applies to you.** We realise you may consider that two or more statements in any one section relate to you, but please just mark the box that most closely describes your problem.

Office Use Only

Name _____

Date _____

Section 1: Pain Intensity

☐ I have no pain at the moment
☐ The pain is very mild at the moment
☐ The pain is moderate at the moment
☐ The pain is fairly severe at the moment
☐ The pain is very severe at the moment
☐ The pain is the worst imaginable at the moment

Section 2: Personal Care (Washing, Dressing, etc.)

☐ I can look after myself normally without causing extra pain
☐ I can look after myself normally but it causes extra pain
☐ It is painful to look after myself and I am slow and careful
☐ I need some help but can manage most of my personal care
☐ I need help every day in most aspects of self care
☐ I do not get dressed, I wash with difficulty and stay in bed

Section 3: Lifting

☐ I can lift heavy weights without extra pain
☐ I can lift heavy weights but it gives extra pain
☐ Pain prevents me lifting heavy weights off the floor, but I can manage if they are conveniently placed, for example on a table
☐ Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned
☐ I can only lift very light weights
☐ I cannot lift or carry anything

Section 4: Reading

☐ I can read as much as I want to with no pain in my neck
☐ I can read as much as I want to with slight pain in my neck
☐ I can read as much as I want with moderate pain in my neck
☐ I can't read as much as I want because of moderate pain in my neck
☐ I can hardly read at all because of severe pain in my neck
☐ I cannot read at all

Section 5: Headaches

☐ I have no headaches at all
☐ I have slight headaches, which come infrequently
☐ I have moderate headaches, which come infrequently
☐ I have moderate headaches, which come frequently
☐ I have severe headaches, which come frequently
☐ I have headaches almost all the time

Section 6: Concentration

☐ I can concentrate fully when I want to with no difficulty
☐ I can concentrate fully when I want to with slight difficulty
☐ I have a fair degree of difficulty in concentrating when I want to
☐ I have a lot of difficulty in concentrating when I want to
☐ I have a great deal of difficulty in concentrating when I want to
☐ I cannot concentrate at all

Section 7: Work

- ☐ I can do as much work as I want to
- ☐ I can only do my usual work, but no more
- ☐ I can do most of my usual work, but no more
- ☐ I cannot do my usual work
- ☐ I can hardly do any work at all
- ☐ I can't do any work at all

Section 8: Driving

- ☐ I can drive my car without any neck pain
- ☐ I can drive my car as long as I want with slight pain in my neck
- ☐ I can drive my car as long as I want with moderate pain in my neck
- ☐ I can't drive my car as long as I want because of moderate pain in my neck
- ☐ I can hardly drive at all because of severe pain in my neck
- ☐ I can't drive my car at all

Section 9: Sleeping

- ☐ I have no trouble sleeping
- ☐ My sleep is slightly disturbed (less than 1 hr sleepless)
- ☐ My sleep is mildly disturbed (1-2 hrs sleepless)
- ☐ My sleep is moderately disturbed (2-3 hrs sleepless)
- ☐ My sleep is greatly disturbed (3-5 hrs sleepless)
- ☐ My sleep is completely disturbed (5-7 hrs sleepless)

Section 10: Recreation

- ☐ I am able to engage in all my recreation activities with no neck pain at all
- ☐ I am able to engage in all my recreation activities, with some pain in my neck
- ☐ I am able to engage in most, but not all of my usual recreation activities because of pain in my neck
- ☐ I am able to engage in a few of my usual recreation activities because of pain in my neck
- ☐ I can hardly do any recreation activities because of pain in my neck
- ☐ I can't do any recreation activities at all

Score: ___/50 Transform to percentage score x 100 = %points

Scoring: For each section the total possible score is 5: if the first statement is marked the section score = 0, if the last statement is marked it = 5. If all ten sections are completed the score is calculated as follows:

Example: 16 (total scored)
50 (total possible score) x 100 = 32%

If one section is missed or not applicable the score is calculated:

16 (total scored)
45 (total possible score) x 100 = 35.5%

Minimum Detectable Change (90% confidence): 5 points or 10 %points

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NDI developed by: Vernon, H. & Mior, S. (1991). The Neck Disability Index: A study of reliability and validity. Journal of Manipulative and Physiological Therapeutics. 14, 409-415

The Neck Disability Index

An instrument for measuring self-rated disability due to neck pain or whiplash-associated disorder

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1. Introduction

The Neck Disability Index (NDI) was developed in the late 1980's by Dr. Howard Vernon and first published in the Journal of Manipulative and Physiological Therapeutics in 1991 [1]. The NDI was modelled on a similar instrument for assessing self-rated disability in low back pain patients – the Oswestry Low Back Pain Disability Questionnaire, which had been in existence for about eight years. Dr. Vernon received permission from the developer of the "Oswestry Index" to modify it for use in neck pain patients.

After selecting some of the original items from the Oswestry Index and then developing new items for neck pain patients, the prototype of the NDI was tested on a group of neck pain patients as well as chiropractors. Several modifications were made until a final version was acceptable. This version was then tested for reliability and validity and the results of these tests were published in the 1991 article. When it was published, the NDI became the first instrument for testing self-rated disability in neck pain patients.

Since 1991, a number of other questionnaires for neck pain patients have been developed, but the NDI remains the oldest and most widely used of these instruments [2]. Here are some more details:

- As of mid-2008, over 350 articles in the scientific literature have cited the NDI.
- It has been used in 40 studies related to whiplash injury.
- It has been translated into over 20 languages.
- It has been used in 103 treatment studies, including 43 surgical studies, 57 studies of non-surgical treatments. 46 of these studies have been randomized clinical trials.

2. Primary findings on the NDI:

Vernon's review paper of 2008 [6] is included in this manual and provides specific data from all of the studies of the psychometric properties of the NDI. The following is a summary of these findings:

The NDI has been shown to be highly reliable on what is called "test-retest" reliability [1]. The individual items have been shown to group together well as a single measure of self-rated physical disability [3].

The NDI has also been shown to be valid by comparing NDI scores to other measures of pain and disability [1, 4].

An important finding as published in the late 1990's by Riddle and Stratford [5]. They found that, for patients with scores in the mild-to-moderate range (where most patients score), there was a certain number of NDI points that could be regarded as "minimally important clinical change" by patients. This number is 5 or 10%. So, if your patient first scores 15 out of 50, and then, two weeks later, scores 12, this would not be regarded as a clinically important change. However, if they scored 10 or less, than this would be regarded as a clinically important change.

3. Scoring the NDI:

The NDI consists of 10 items, each with a score up to 5, for a total score of 50. The lower the score, the less self-rated disability. Dr. Vernon established the following guide to interpretation of a patient's score [1]:

- 0 – 4 = No disability
- 5 – 14 = Mild disability
- 15 – 24 = Moderate disability
- 25 – 34 = Severe disability
- 35 or over = Complete disability

4. Item issues:

Users should attempt to have all 10 items completed at all administrations. Some patients may find 1-2 items not applicable to their lives. This is especially true of **"driving"**. This item may be omitted and the instrument scored out of 45, converted to 100% and then divided by 2.

The other item which may cause some problem is "work". While the term "work" was meant for any circumstance, many people interpret it as "work at my job". Therefore, if they are not employed, they may decline to complete this item. In that case, please re-interpret this item as "housework" for anyone not working out of the house.

For missing items not explained above (simple omissions, etc), only up to 2 missed items should be allowed. With 3 or more missed items, the administration would be regarded as unacceptable.

For 1-2 missed items, there are two strategies that amount to the same result:

- take the score out of 45 or 40, convert to 100% and divide by 2
- insert the average item score (total score divided by 9 or 8) into each missing item

5. Using the NDI:

The NDI should be an important part of your first assessment of any patient with neck pain, especially due to trauma. The question arises, "when should I repeat the NDI?" Remember that the NDI measures self-rated disability, not just current pain level. This applies to a person's ability to perform their daily activities. A single, composite measure of this ability (the NDI score) is not likely to change over a short period of time. So, we recommend that the NDI be used on 2-week intervals over the course of your treatment of a patient with neck pain.

6. Links:

http://www.proqolid.org/

http://www.pedro.fhs.usyd.edu.au/CEBP/index_cebp.html

http://www.worksafe.vic.gov.au

http://www.medigraphsoftware.com

http://www.painworld.zip.com

http://medal.org

http://outcomesassessment.org
http://www.maa.nsw.gov.au

http://apa.advsol.com.au/physio_and_health/research/evidence/outcome_measures.cfm

http://caretrak-outcomes.com

http://ccachiro.org

http://www.unisa.edu.au/cahe/

http://www.tac.vic.gov.au/jsp/content/NavigationController.do?areaID=22&tierID=1&navID=92ACB96A7F000001011DDD0421B6C947&navLink=null&pageID=942

http://clinicaltrials.gov/ct/show/NCT00349544;jsessionid=26CC121CFA39CE943448CF75822A8C60?order=1

http://www.cks.library.nhs.uk

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A complete list of all the NDI citations is available from Dr. Vernon at hvernon@cmcc.ca.

DUTCH VERSION NECK DISABILITY INDEX : INSTRUMENT AND INTERPRETATION

Neck Disability Index
Vernon 1991

1. Pijn
- ❑ Ik heb nu geen pijn
- ❑ Ik heb nu weinig pijn
- ❑ Ik heb nu matige pijn
- ❑ Ik heb nu vrij hevige pijn
- ❑ Ik heb nu zeer hevige pijn
- ❑ Ik heb nu de slechts denkbare pijn

2. Persoonlijke verzorging (wassen, aan- en uitkleden)
- ❑ Ik kan goed voor mezelf zorgen zonder dat de pijn toeneemt
- ❑ Ik kan goed voor mezelf zorgen hoewel dat de pijn doet toenemen
- ❑ Voor mezelf zorgen is pijnlijk en gaat langzaam en voorzichtig
- ❑ Voor mezelf zorgen lukt goed maar vaak met enige hulp
- ❑ Elke dag voor mezelf zorgen lukt meestal alleen met hulp
- ❑ Ik kan mezelf niet aankleden; mezelf wassen gaat moeilijk en ik blijf in bed

3. Tillen
- ❑ Ik kan een zwaar gewicht tillen zonder dat de pijn toeneemt
- ❑ Ik kan een zwaar gewicht tillen, maar dat doet de pijn toenemen
- ❑ De pijn weerhoudt mij van het optillen van een zwaar gewicht van de grond, maar zou dat wel kunnen wanneer dat gewicht hoger (bijv. op een tafel) gelegen is
- ❑ Ik kan alleen zeer lichte gewichten tillen
- ❑ Ik kan helemaal niets tillen of dragen

4. Lezen
- ❑ Ik kan zo veel lezen als ik wil zonder pijn in mijn nek
- ❑ Ik kan zo veel lezen als ik wil met weinig pijn in mijn nek
- ❑ Ik kan zo veel lezen als ik wil met matige pijn in mijn nek
- ❑ Ik kan niet zo veel lezen als ik zou willen vanwege de matige pijn in mijn nek
- ❑ Ik kan bijna niet meer lezen vanwege de hevige pijn in mijn nek
- ❑ Ik kan helemaal niet meer lezen

5. Hoofdpijn
- ❑ Ik heb helemaal geen hoofdpijn
- ❑ Ik heb af en toe lichte hoofdpijn
- ❑ Ik heb af en toe matige hoofdpijn
- ❑ Ik heb vaak matige hoofdpijn
- ❑ Ik heb vaak hevige hoofdpijn
- ❑ Ik heb bijna altijd hoofdpijn

6. Concentratie
- ❑ Ik kan mij goed concentreren zonder moeite wanneer ik dat wil
- ❑ Ik kan mij goed concentreren met enige moeite wanneer ik dat wil
- ❑ Het kost mij duidelijk moeite om te concentreren wanneer ik dat wil
- ❑ Het kost mij veel moeite om te concentreren wanneer ik dat wil
- ❑ Het kost mij zeer veel moeite om te concentreren wanneer ik dat wil
- ❑ Ik kan mij helemaal niet concentreren

7. Werk
- ❑ Ik kan zo veel werk doen als ik wil
- ❑ Ik kan alleen mijn gewone werk doen, maar niet meer
- ❑ Ik kan het grootste deel van mijn gewone werk doen, maar niet meer
- ❑ Ik kan mijn gewone werk niet doen
- ❑ Ik kan bijna geen enkel werk meer doen
- ❑ Ik kan helemaal niet meer werken

8 Autorijden
- ❑ Ik kan autorijden zonder enige nekpijn
- ❑ Ik kan autorijden zo lang als ik wil met weinig pijn in mijn nek
- ❑ Ik kan autorijden zo lang als ik wil met matige pijn in mijn nek
- ❑ Ik kan niet autorijden zo lang als ik wil vanwege de matige pijn in mijn nek
- ❑ Ik kan bijna niet meer autorijden vanwege de hevige pijn in mijn nek
- ❑ Ik kan helemaal niet meer autorijden

9. Slapen
- ❑ Ik heb geen moeite met slapen
- ❑ Mijn slaap is heel licht gestoord (minder dan 1 uur wakker)
- ❑ Mijn slaap is licht gestoord (1 tot 2 uur wakker)
- ❑ Mijn slaap is matig gestoord (2 tot 3 uur wakker)
- ❑ Mijn slaap is fors gestoord (3 tot 5 uur wakker)
- ❑ Mijn slaap is volledig gestoord (5 tot 7 uur wakker)

10. Vrije tijd
- ❑ Ik kan aan alle activiteiten meedoen zonder enige pijn in mijn nek
- ❑ Ik kan aan alle activiteiten meedoen met enige pijn in mijn nek
- ❑ Vanwege de pijn in mijn nek kan ik aan de meeste, maar niet alle, gebruikelijke activiteiten meedoen
- ❑ Vanwege de pijn in mijn nek kan ik aan maar weinig gebruikelijke activiteiten meedoen
- ❑ Vanwege de pijn in mijn nek kan ik nagenoeg aan geen activiteiten meedoen
- ❑ Ik kan aan geen enkele activiteit meer meedoen

MEETINSTRUMENT: Neck Disability Index (NDI)

Beschrijving:

De neck disability index (NDI) is een modificatie van de Oswestry vragenlijst voor lage rugklachten. De opzet van deze vragenlijst is gelijk aan de Oswestry. Alleen de items en de antwoordcategorieën zijn aangepast voor patiënten met nekklachten[1].

Doelgroep	Benodigde tijd	Kosten	Scholing vereist
Patiënten met chronische klachten in de nek, whip-lash,	8-12 minuten	Fotokopie	Geen specifieke scholing vereist

INSTRUCTIES AAN PATIËNT

Met de vragenlijst willen wij een indruk krijgen over beperkingen die u ondervindt in het dagelijks leven ten gevolge van nekklachten.

"Kruis bij elke vraag het antwoord aan dat het meest uw situatie weergeeft"

OVERZICHT

Vorm

Een door de patiënt zelf in te vullen vragenlijst van 10 items.

Subschalen

Geen. De vragenlijst meet 10 deelgebieden van het dagelijks functioneren: pijnintensiteit, zelfverzorging, tillen, lezen, hoofdpijn, concentratie, werk, autorijden, slaap, vrije tijd.

Scoring

Per vraag zijn er 6 antwoordcategorieën. De eerste antwoordcategorie (score 0) geeft geen beperkingen aan, de laatste categorie (score 5) betekent de meeste beperkingen.
De totaalscore is de som van de tien delen vragen (maximaal 50) vermenigvuldigd met factor 2. De gevonden waarde representeert het "beperkingen-percentage" (0-100%).

BETROUWBAARHEID

Interne consistentie

De interne consistentie is goed Cronbach's alpha = 0.80 [1]

Test-hertest betrouwbaarheid

De test hertest betrouwbaarheid goed over een periode van:
twee dagen r = 0,89 [1]

Inter-/intrabeoordelaars betrouwbaarheid

VALIDITEIT

Inhoudsvaliditeit

Face validity op basis van peer-review en patiënten feedback.

Constructvaliditeit

De correlatie van de NDI met ander meetinstrumenten is berekend :
de McGill Pain Questionnaire totaal r = 0.70 [1]
de McGill Pain Questionnaire pijnwoorden r = 0.69[1]
de pijnintensiteit (VAS) r = 0.65[1]

Criterium validiteit

Responsiviteit

De correlatie van de veranderingsscores van de NDI met de verbetering in activiteiten (gescoord op een VAS) (longitudinale constructvaliditeit) is r = 0.60 [1]

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WAAR VERKRIJGBAAR

Hoofdstuk 5

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Wettelijk depot : D/2008/10.273/54

KCE reports

1. Effectiviteit en kosten-effectiviteit van behandelingen voor rookstop. D/2004/10.273/1.
2. Studie naar de mogelijke kosten van een eventuele wijziging van de rechtsregels inzake medische aansprakelijkheid (fase 1). D/2004/10.273/2.
3. Antibioticagebruik in ziekenhuizen bij acute pyelonefritis. D/2004/10.273/5.
4. Leukoreductie. Een mogelijke maatregel in het kader van een nationaal beleid voor bloedtransfusieveiligheid. D/2004/10.273/7.
5. Het preoperatief onderzoek. D/2004/10.273/9.
6. Validatie van het rapport van de Onderzoekscommissie over de onderfinanciering van de ziekenhuizen. D/2004/10.273/11.
7. Nationale richtlijn prenatale zorg. Een basis voor een klinisch pad voor de opvolging van zwangerschappen. D/2004/10.273/13.
8. Financieringssystemen van ziekenhuisgeneesmiddelen: een beschrijvende studie van een aantal Europese landen en Canada. D/2004/10.273/15.
9. Feedback: onderzoek naar de impact en barrières bij implementatie – Onderzoeksrapport: deel 1. D/2005/10.273/01.
10. De kost van tandprothesen. D/2005/10.273/03.
11. Borstkankerscreening. D/2005/10.273/05.
12. Studie naar een alternatieve financiering van bloed en labiele bloedderivaten in de ziekenhuizen. D/2005/10.273/07.
13. Endovasculaire behandeling van Carotisstenose. D/2005/10.273/09.
14. Variaties in de ziekenhuispraktijk bij acuut myocardinfarct in België. D/2005/10.273/11.
15. Evolutie van de uitgaven voor gezondheidszorg. D/2005/10.273/13.
16. Studie naar de mogelijke kosten van een eventuele wijziging van de rechtsregels inzake medische aansprakelijkheid. Fase II : ontwikkeling van een actuarieel model en eerste schattingen. D/2005/10.273/15.
17. Evaluatie van de referentiebedragen. D/2005/10.273/17.
18. Prospectief bepalen van de honoraria van ziekenhuisartsen op basis van klinische paden en guidelines: makkelijker gezegd dan gedaan.. D/2005/10.273/19.
19. Evaluatie van forfaitaire persoonlijk bijdrage op het gebruik van spoedgevallendienst. D/2005/10.273/21.
20. HTA Moleculaire Diagnostiek in België. D/2005/10.273/23, D/2005/10.273/25.
21. HTA Stomamateriaal in België. D/2005/10.273/27.
22. HTA Positronen Emissie Tomografie in België. D/2005/10.273/29.
23. HTA De electieve endovasculaire behandeling van het abdominale aorta aneurysma (AAA). D/2005/10.273/32.
24. Het gebruik van natriuretische peptides in de diagnostische aanpak van patiënten met vermoeden van hartfalen. D/2005/10.273/34.
25. Capsule endoscopie. D/2006/10.273/01.
26. Medico–legale aspecten van klinische praktijkrichtlijnen. D2006/10.273/05.
27. De kwaliteit en de organisatie van type 2 diabeteszorg. D2006/10.273/07.
28. Voorlopige richtlijnen voor farmaco-economisch onderzoek in België. D2006/10.273/10.
29. Nationale Richtlijnen College voor Oncologie: A. algemeen kader oncologisch kwaliteitshandboek B. wetenschappelijke basis voor klinische paden voor diagnose en behandeling colorectale kanker en testiskanker. D2006/10.273/12.
30. Inventaris van databanken gezondheidszorg. D2006/10.273/14.
31. Health Technology Assessment prostate-specific-antigen (PSA) voor prostaatkankerscreening. D2006/10.273/17.
32. Feedback : onderzoek naar de impact en barrières bij implementatie – Onderzoeksrapport : deel II. D/2006/10.273/19.
33. Effecten en kosten van de vaccinatie van Belgische kinderen met geconjugeerd pneumokokkenvaccin. D/2006/10.273/21.
34. Trastuzumab bij vroegtijdige stadia van borstkanker. D/2006/10.273/23.
35. Studie naar de mogelijke kosten van een eventuele wijziging van de rechtsregels inzake medische aansprakelijkheid (fase III)- precisering van de kostenraming. D/2006/10.273/26.
36. Farmacologische en chirurgische behandeling van obesitas. Residentiële zorg voor ernstig obese kinderen in België. D/2006/10.273/28.

37. HTA Magnetische Resonantie Beeldvorming. D/2006/10.273/32.
38. Baarmoederhalskankerscreening en testen op Human Papillomavirus (HPV). D/2006/10.273/35
39. Rapid assessment van nieuwe wervelzuil technologieën : totale discusprothese en vertebro/ballon kyfoplastie. D/2006/10.273/38.
40. Functioneel bilan van de patiënt als mogelijke basis voor nomenclatuur van kinesitherapie in België? D/2006/10.273/40.
41. Klinische kwaliteitsindicatoren. D/2006/10.273/43.
42. Studie naar praktijkverschillen bij electieve chirurgische ingrepen in België. D/2006/10.273/45.
43. Herziening bestaande praktijkrichtlijnen. D/2006/10.273/48.
44. Een procedure voor de beoordeling van nieuwe medische hulpmiddelen. D/2006/10.273/50.
45. HTA Colorectale Kankerscreening: wetenschappelijke stand van zaken en budgetimpact voor België. D/2006/10.273/53.
46. Health Technology Assessment. Polysomnografie en thuismonitoring van zuigelingen voor de preventie van wiegendood. D/2006/10.273/59.
47. Geneesmiddelengebruik in de belgische rusthuizen en rust- en verzorgingstehuizen. D/2006/10.273/61
48. Chronische lage rugpijn. D/2006/10.273/63.
49. Antivirale middelen bij seizoensgriep en grieppandemie. Literatuurstudie en ontwikkeling van praktijkrichtlijnen. D/2006/10.273/65.
50. Eigen betalingen in de Belgische gezondheidszorg. De impact van supplementen. D/2006/10.273/68.
51. Chronische zorgbehoeften bij personen met een niet- aangeboren hersenletsel (NAH) tussen 18 en 65 jaar. D/2007/10.273/01.
52. Rapid Assessment: Cardiovasculaire Primaire Preventie in de Belgische Huisartspraktijk. D/2007/10.273/03.
53. Financiering van verpleegkundige zorg in ziekenhuizen. D/2007/10 273/06
54. Kosten-effectiviteitsanalyse van rotavirus vaccinatie van zuigelingen in België
55. Evidence-based inhoud van geschreven informatie vanuit de farmaceutische industrie aan huisartsen. D/2007/10.273/12.
56. Orthopedisch Materiaal in België: Health Technology Assessment. D/2007/10.273/14.
57. Organisatie en Financiering van Musculoskeletale en Neurologische Revalidatie in België. D/2007/10.273/18.
58. De Implanteerbare Defibrillator: een Health Technology Assessment. D/2007/10.273/21.
59. Laboratoriumtesten in de huisartsgeneeskunde. D2007/10.273/24.
60. Longfunctie testen bij volwassenen. D/2007/10.273/27.
61. Vacuümgeassisteerde Wondbehandeling: een Rapid Assessment. D/2007/10.273/30
62. Intensiteitsgemoduleerde Radiotherapie (IMRT). D/2007/10.273/32.
63. Wetenschappelijke ondersteuning van het College voor Oncologie: een nationale praktijkrichtlijn voor de aanpak van borstkanker. D/2007/10.273/35.
64. HPV Vaccinatie ter Preventie van Baarmoederhalskanker in België: Health Technology Assessment. D/2007/10.273/41.
65. Organisatie en financiering van genetische diagnostiek in België. D/2007/10.273/44.
66. Health Technology Assessment: Drug-Eluting Stents in België. D/2007/10.273/47
67. Hadrontherapie. D/2007/10.273/50.
68. Vergoeding van schade als gevolg van gezondheidszorg – Fase IV : Verdeelsleutel tussen het Fonds en de verzekeraars. D/2007/10.273/52.
69. Kwaliteit van rectale kankerzorg – Fase 1: een praktijkrichtlijn voor rectale kanker D/2007/10.273/54.
70. Vergelijkende studie van ziekenhuisaccrediterings-programma's in Europa D/2008/10.273/57.
71. Aanbevelingen voor het gebruik van vijf oftalmologische testen in de klinische praktijk .D/2008/10.273/04
72. Het aanbod van artsen in België. Huidige toestand en toekomstige uitdagingen. D/2008/10.273/07

73. Financiering van het zorgprogramma voor de geriatrische patiënt in algemene ziekenhuizen: definitie en evaluatie van een geriatrische patiënt, definitie van de interne liaisongeriatrie en evaluatie van de middelen voor een goede financiering. D/2008/10.273/11
74. Hyperbare Zuurstoftherapie: Rapid Assessment. D/2008/10.273/13.
75. Wetenschappelijke ondersteuning van het College voor Oncologie: een nationale praktijkrichtlijn voor de aanpak van slokdarm- en maagkanker. D/2008/10.273/16.
76. Kwaliteitsbevordering in de huisartsenpraktijk in België: status quo of quo vadis? D/2008/10.273/18.
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78. Richtlijnen voor farmaco-economische evaluaties in België. D/2008/10.273/23.
79. Terugbetaling van radioisotopen in België. D/2008/10.273/26
80. Evaluatie van de effecten van de maximumfactuur op de consumptie en financiële toegankelijkheid van gezondheidszorg. D/2008/10.273/35.
81. Kwaliteit van rectale kankerzorg – phase 2: ontwikkeling en test van een set van kwaliteitsindicatoren. D/2008/10.273/38
82. 64-Slice computertomografie van de kransslagaders bij patiënten met vermoeden van coronaire hartziekte. D/2008/10.273/40
83. Internationale vergelijking van terugbetalingsregels en juridische aspecten van plastische heelkunde. D/200810.273/43
84. Langverblijvende psychiatrische patiënten in T-bedden. D/2008/10.273/46
85. Vergelijking van twee financieringssystemen voor de eerstelijnszorg in België. D/2008/10.273/49.
86. Functiedifferentiatie in de verpleegkundige zorg: mogelijkheden en beperkingen. D/2008/10.273/52.
87. Het gebruik van kinesitherapie en van fysische geneeskunde en revalidatie in België. D/2008/10.273/54.
88. Chronisch Vermoeidheidssyndroom: diagnose, behandeling en zorgorganisatie. D/2008/10.273/58.
89. Rapid assessment van enkele nieuwe behandelingen voor prostaatkanker en goedaardige prostaathypertrofie. D/2008/10.273/61
90. Huisartsgeneeskunde: aantrekkingskracht en beroepstrouw bevorderen. D/2008/10.273/63
91. Hoorapparaten in België: health technology assessment. D/2008/10.273/67
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94. Intensieve maternele verzorging (Maternal Intensive Care) in België. D/2008/10.273/77
95. Percutane hartklep implantatie bij congenitale en degeneratieve klepletsels: A rapid Health Technology Assessment. D/2008/10.273/79
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97. NOK/PSY revalidatiecentra: doelgroepen, wetenschappelijke evidentie en zorgorganisatie. D/2009/10.273/84
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100. Drempelwaarden voor kosteneffectiviteit in de gezondheidszorg. D/2008/10.273/94
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106. Magnetische Resonantie Beeldvorming: kostenstudie. D/2009/10.273/14
107. Vergoeding van schade ten gevolge van gezondheidszorg – Fase V: Budgettaire impact van de omzetting van het Franse systeem in België. D/2009/10.273/16

108. Tiotropium in de behandeling van Chronisch Obstructief Longlijden (COPD): Health Technology Assessment. D/2009/10.273/18
109. De waarde van EEG en geëvokeerde potentialen in de klinische praktijk.3 D/2009/10.273/21
110. Positron Emissie Tomografie: een update. D/2009/10.273/24
111. Medicamenteuze en niet-medicamenteuze interventies voor de ziekte van Alzheimer, een rapid assessment. D/2009/10.273/27
112. Beleid voor weesziekten en weesgeneesmiddelen. D/2009/10.273/30.
113. Het volume van chirurgische ingrepen en de impact ervan op de uitkomst: haalbaarheidsstudie op basis van Belgische gegevens. D/2009/10.273/33.
114. Endobronchiale kleppen bij de behandeling van ernstig longemfyseem Een "rapid" Health Technology Assessment. D/2009/10.273/37.
115. Organisatie van palliatieve zorg in België. D/2009/10.273/40
116. Rapid assessment van interspinale implantaten en pedikelschroeven voor dynamische stabilisatie van de lumbale wervelkolom. D/2009/10.273/44
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119. Aspecifieke nekpijn: diagnose en behandeling. D/2009/10.273/54.