

# Philippine Academy of Rehabilitation Medicine (PARM):



## Clinical Practice Guidelines on the Diagnosis and Management of Neck Pain (2014)



## **FOREWORD**

On behalf of the Philippine Academy of Rehabilitation Medicine, we commend the PARM Clinical Practice Guidelines (CPG) Team of Experts for their successful completion of the PARM Neck and Shoulder Pain CPG.

These CPG addenda will be a gain for our Physiatric practice; to aid us in our critical clinical choices, and to define and refine our management. Furthermore, the PARM CPG is a needed reference in our efforts to develop the Philippine Health Insurance Corporation (PHIC) Rehabilitation Medicine package.

As we take pride in the honor that our previous CPG on Low Back Pain was officially acknowledged and endorsed by the International Society of Physical and Rehabilitation Medicine (ISPRM), we anticipate a similar achievement to be rendered for our other CPG series.

Again, our Congratulations and sincere Gratitude to the PARM CPG team for this legacy!

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# Contents

|   |    |
|---|----|
| <b>Glossary</b> .....   | 9  |
| <b>1 Introduction</b> .....                                     | 14 |
| 1.1 The need for a guideline.....                               | 14 |
| 1.2 Clinical guidelines supporting evidence-based practice..... | 15 |
| 1.2.1 Getting guidelines into practice.....                     | 16 |
| 1.3 Clinical care pathway in low back pain.....                 | 18 |
| <b>2 Methodology</b> .....                                      | 19 |
| 2.1 Purpose and scope.....                                      | 19 |
| 2.2 Guideline search process.....                               | 19 |
| 2.3 Critical appraisal.....                                     | 19 |
| 2.4 Extraction of relevant data for care pathway.....           | 20 |
| 2.5 Contextualization.....                                      | 21 |
| 2.6 PARM endorsements.....                                      | 24 |
| 2.7 PARM context points.....                                    | 24 |
| 2.8 Guidelines.....   | 25 |
| 2.8.1 Guideline Results .....                                   | 26 |
| 2.8.2 Guideline classification of evidence strength.....        | 26 |
| 2.9 Filling the gaps.....                                       | 29 |
| 2.10 Public consultation.....                                   | 30 |
| 2.11 Implementation plans.....                                  | 30 |
| 2.12 Date of production.....                                    | 31 |
| 2.13 Expected date of revision.....                             | 31 |
| 2.14 Guidelines developers.....                                 | 32 |

|          |   |    |
|----------|---|----|
| <b>3</b> | <b>Evaluation and diagnosis of neck pain: medical history</b> .....   | 33 |
| 3.1      | Pathoanatomical diagnosis.....  | 33 |
| 3.2      | Risk factors.....   | 34 |
| 3.3      | Identifying psychosocial factors.....   | 34 |
| 3.4      | Identifying and referring serious neck conditions.....  | 35 |
| 3.5      | Assessing neck trauma.....  | 35 |
| <b>4</b> | <b>Mechanical neck pain</b> .....   | 36 |
| 4.1      | Classifying acute mechanical neck pain.....   | 36 |
| 4.2      | Outcome measures for neck pain in general.....  | 36 |
| 4.3      | Management of mechanical neck pain.....   | 37 |
| 4.3.1    | Acute mechanical neck pain.....   | 37 |
| 4.3.1.1  | Cervical manipulation, thoracic manipulation, cervical traction.....  | 37 |
| 4.3.2    | Sub-acute mechanical neck pain.....   | 37 |
| 4.3.2.1  | Western massage.....  | 37 |
| 4.3.3    | Chronic mechanical neck pain.....   | 38 |
| 4.3.3.1  | Therapeutic Exercises: Flexibility/stretching, coordination, strengthening,<br>endurance exercises.....                 | 38 |
| 4.3.3.2  | Cervical manipulation, thoracic manipulation, cervical traction.....  | 38 |
| 4.3.3.3  | Massage: traditional Chinese massage, Western massage, Swedish massage.....   | 39 |
| 4.4      | PARM Context points for minimum and additional standard care of practice for<br>management of mechanical neck pain..... | 40 |
| <b>5</b> | <b>Cervical radiculopathy</b> .....   | 41 |
| 5.1      | Symptoms of cervical radiculopathy.....   | 41 |
| 5.1.1    | Typical symptoms of cervical radiculopathy.....   | 41 |
| 5.1.2    | Atypical symptoms of cervical radiculopathy.....  | 41 |

|          |   |           |
|----------|---|-----------|
| 5.2      | Physical examination of cervical radiculopathy.....   | 42        |
| 5.2.1    | Neurological testing for cervical radiculopathy.....  | 42        |
| 5.2.2    | Special tests for cervical radiculopathy.....   | 42        |
| 5.3      | Ancillary and diagnostic tests for cervical radiculopathy.....  | 43        |
| 5.3.1    | Computed Tomography (CT), CT Myelography and<br>Magnetic Resonance Imaging (MRI).....                                     | 43        |
| 5.3.2    | Electromyography.....   | 44        |
| 5.3.3    | Selective nerve block.....  | 44        |
| 5.4      | Outcome measures for cervical radiculopathy.....  | 45        |
| 5.5      | Management of cervical radiculopathy.....   | 46        |
| 5.5.1    | Cervical manipulation, cervical traction, neural mobilization and combination therapy in<br>cervical radiculopathy .....  | 46        |
| 5.5.2    | Addressing psychosocial factors.....  | 47        |
| 5.5.3    | Interventional/invasive procedures.....   | 47        |
| 5.5.4    | Surgical management.....  | 48        |
| 5.6      | PARM Context points for minimum and additional standard care of practice for<br>management of cervical radiculopathy..... | 50        |
| <b>6</b> | <b>Whiplash-associated disorders.....</b>   | <b>52</b> |
| 6.1      | History-taking for whiplash-associated disorders.....   | 52        |
| 6.2      | Assessment of whiplash-associated disorders.....  | 52        |
| 6.2.1    | Physical examination for whiplash-associated disorders.....   | 52        |
| 6.2.2    | Grading whiplash-associated disorders.....  | 53        |
| 6.3      | Outcome measures for whiplash-associated disorders.....   | 54        |
| 6.4      | Prognosis for whiplash-associated disorders.....  | 55        |
| 6.5      | Management of whiplash-associated disorders.....  | 57        |
| 6.5.1    | Acute whiplash-associated disorder (Acute whiplash injury).....   | 57        |

|  |           |
|--|-----------|
| 6.5.1.1 Physical activity and Exercises.....   | 57        |
| 6.5.1.2 Cervical manipulation, cervical collar, physical modalities.....   | 58        |
| 6.5.1.3 Pharmacological agents.....  | 59        |
| 6.5.1.4 Interventional procedures.....   | 60        |
| 6.5.1.5 Surgical management.....   | 60        |
| 6.5.2 Chronic whiplash-associated disorder (Chronic whiplash disease).....   | 60        |
| 6.5.2.1 Physical activity and exercises.....   | 60        |
| 6.5.2.2 Cognitive Behavioral Approach, Cervical Manipulation,<br>Cervical Collar, Physical Modalities.....                                     | 61        |
| 6.5.2.3 Pharmacological Agents.....  | 62        |
| 6.5.2.4 Interventional Procedures.....   | 62        |
| 6.5.2.5 Surgical Management.....   | 63        |
| 6.6 PARM Context points for minimum and additional standard care of practice for<br>management of whiplash-associated disorder.....            | 64        |
| <b>7 Neck pain with headache (Cervicocranial syndrome).....</b>  | <b>66</b> |
| 7.1 Classifying Cervicocranial Syndrome.....   | 66        |
| 7.2 Management for cervicocranial syndrome.....  | 67        |
| 7.2.1 Cervical manipulation, specific exercises.....   | 67        |
| 7.3 PARM Context points for minimum and additional standard care of practice for<br>management of cervicocranial syndrome.....                 | 68        |
| <b>8 Neck pain with myofascial pain syndrome (MPS).....</b>  | <b>69</b> |
| 8.1 Management for neck pain with MPS.....   | 69        |
| 8.1.1 Myofascial release and ischemic compression therapy.....   | 69        |
| 8.2 PARM Context points for minimum and additional standard care of practice for<br>management of neck pain with myofascial pain syndrome..... | 70        |
| <b>Abbreviations.....</b>  | <b>71</b> |

|                         |    |
|-------------------------|----|
| <b>Index</b> .....      | 73 |
| <b>Appendices</b> ..... | 76 |
| <b>References</b> ..... | 84 |

# Glossary

**Acute mechanical neck pain** – neck pain, of less than four weeks’ (one month) duration, which is brought about by disruption of cervical anatomical structures resulting from spinal abnormalities, degenerative change, or poor posture, once serious medical pathology has been excluded.

**Acute whiplash injury** – neck disorder resulting from an acceleration-deceleration or hyperextension-hyperflexion trauma due to a rapid change in the position of the head that imparts energy transfer to the structures of the cervical spine, with symptoms arising within 12 weeks of injury.

**Analgesic** – refers to an agent that relieves pain without causing loss of consciousness.

**Anterior Cervical Discectomy (ACD)** - a surgical procedure performed via an anterior neck approach, to remove a herniated or degenerative disc in the cervical spine to decompress nerve roots.

**Anterior Cervical Discectomy and Fusion (ACDF)** – a surgical procedure performed via an anterior neck approach, to remove a herniated or degenerative disc in the cervical spine to decompress nerve roots and fuse the unstable vertebral segments.

**Anterior Cervical Fusion (ACF)** – a surgical procedure performed by placing a bone graft between two or more vertebrae allowing them to grow together or fuse.

**Botulinum toxin** - a protein and neurotoxin produced by the bacterium *Clostridium botulinum*, which blocks neuromuscular transmission through decreased acetylcholine release.

**Cervical Collar** - refer to an external appliance in the form of a soft brace worn to passively support the neck

**Cervical compressive myelopathy** – neck disorder resulting from compression of the cervical spinal cord usually by degenerative causes such as osteophytes, discosteophyte complexes, or degenerative spondylolithesis, which may lead to neck pain, sensorimotor disturbances in the limbs, gait problems and bowel or bladder difficulties.

**Cervical manipulation** – technique of treating cervical spine joints with a high velocity, low amplitude (HVLA) thrust in order to improve function and/or decrease pain.

**Cervical radiculopathy** – dysfunction of a cervical nerve root associated with pain, sensory impairment, weakness, or diminished deep tendon reflexes in the nerve root distribution.

**Cervical spondylosis** – degenerative osteoarthritis of the joints between the center of the spinal vertebrae and/or neural foraminae, which may result to cervical nerve root compression with subsequent sensorimotor disturbances in the limbs.

**Cervical traction** – refers to a technique used to stretch soft tissues of the neck and to separate joint surfaces or bone fragments by use of a pulling force of sufficient magnitude and duration while resisting movement of the body with an equal and opposite force (axial decompression).

**Cervicocranial syndrome** - type of neck pain associated with headache and limitation of cervical range of motion, with symptoms often produced or aggravated by provocation of the ipsilateral posterior cervical myofascia and joints.

**Chronic mechanical neck pain** – neck pain of greater than 12 weeks' (three months) duration which is brought about by disruption of cervical anatomical structures resulting from spinal abnormalities, degenerative change, or poor posture, once serious medical pathology has been excluded.

**Chronic whiplash disease** - neck disorder resulting from an acceleration-deceleration or hyperextension-hyperflexion trauma due to a rapid change in the position of the head that imparts energy transfer to the structures of the cervical spine, either with symptoms presenting more than 12 weeks after injury, or within 12 weeks post-injury (acute whiplash injury) who require treatment into the chronic phase.

**Cognitive behavioral approach** – a psychotherapeutic method directed towards modifying aberrant behavioral, emotional and cognitive processes through a range of systematic approaches.

**Cold therapy** – refers to the use of cold applied as cold packs or ice to the back with superficial penetration to soft tissues.

**Degenerative spine disorders** – refers to a group of conditions that involve a loss of normal structure and function in the spine, usually associated with the normal effects of aging, but also may be caused by infection, tumors, muscle strains, or arthritis.

**Diagnostic intra-articular facet joint blocks** – involves the injection of local anesthetic under fluoroscopic guidance into the facet (zygapophyseal) joints.

**Diagnostic selective nerve root block** – involves the injection of local anesthetic around spinal nerves under fluoroscopy.

**Heat therapy** – refers to the use of heat applied as warm packs or heated blankets to the back with superficial penetration to soft tissues.

**Herniated cervical disc** – refers to a localized displacement of the nucleus pulposus beyond the normal margins of the intervertebral disc space in the neck due to a disruption in the annulus fibrosus.

**Ischemic compression therapy** – a treatment method used to address myofascial pain syndrome by applying direct pressure over a trigger point, resulting to temporary blockage of blood flow to the area, but with a consequent resurgence of blood flow once the pressure is released.

**Local injections** – Local injections involve the placement of a local anesthetic (with or without corticosteroid) into the muscles or soft tissues of the neck via a catheter.

**Myofascial Pain Syndrome** – a chronic musculoskeletal pain disorder characterized by local or regional pain due to the presence of specific painful and focal points of tenderness (“myofascial trigger points” or “tender points”).

**Myofascial Release** – or Manual Pressure Release, is a method of soft tissue therapy applied in order to effect pain relief and increased mobility by relaxing contracted muscles, improving blood flow, and enhancing flexibility of myofascial structures.

**Neural mobilization** – a manual therapeutic technique done to improve movement of nerve tissue, through temperate sliding motions, in order to free a specific affected nerve from its surrounding restricting structures.

**Posterior Laminoforaminotomy (PLF)** – a surgical procedure performed via a posterior approach, done either to remove herniated or degenerative discs or to remove bony spurs in the cervical spine to decompress nerve roots.

**Radiofrequency Neurotomy** – a medical procedure where parts of specific nerves are ablated using high frequency alternating current or radio waves, in order to temporarily inhibit transmission of pain impulses.

**Selective nerve block** – a medical procedure where medications are delivered into the space around spinal nerve roots (epidural area), in order to localize nerve root pathology, or to provide relief for radicular pain.

**Shortwave diathermy** – refers to a deep heating modality that produces heat by conversion of electromagnetic energy to thermal energy.

**Spinal stenosis** – refers to narrowing of the spinal column that causes pressure on the spinal cord, or narrowing of the neural foramina.

**Spurling’s maneuver** – a physical examination maneuver done to assess cervical nerve root impingement. This is done by having the patient extend, rotate and laterally flex the neck towards the involved side, and an axial compression force is then applied by the examiner

through the top of the patient's head. A positive sign is considered when this special test elicits typical radicular arm pain or sensation.

**Steroid** – refers to a general class of chemical substances that are structurally related to one another and share the same chemical skeleton (a tetracyclic cyclopenta[a]phenanthrene skeleton).

**Sub-acute mechanical neck pain** – neck pain lasting 4 to 12 weeks (1 to 3 months), which is brought about by disruption of cervical anatomical structures resulting from spinal abnormalities, degenerative change, or poor posture, once serious medical pathology has been ruled out.

**Subcutaneous water injections** - administration of sterile water into the adipose tissue with the goal of affording local pain relief.

**Swedish massage** – massage technique characterized by a system of five stroking techniques applied on deeper muscle tissue and bone, such as: gliding (effleurage), kneading (petrissage), circular pressure (friction), shaking/vibration, hacking/tapping (percussion), and stretching, with the goals of increasing oxygen flow in the blood and releasing toxins from the muscles.

**Thoracic traction** – refers to a technique used to stretch soft tissues of the upper trunk and to separate joint surfaces or bone fragments by use of a pulling force of sufficient magnitude and duration while resisting movement of the body with an equal and opposite force (axial decompression).

**Total Disc Arthroplasty (TDA)** - surgical procedure wherein degenerated intervertebral discs in the spinal column are replaced with artificial devices such as a mobile disc in order to retain mobility in the affected segment.

**Traditional Chinese massage** – massage technique based on principles of Traditional Chinese Medicine, and are of two types: Tui na, which focuses on pushing, stretching and kneading the muscle, and Zhi Ya, which focuses on pinching and pressing at acupressure points.

**Transcutaneous Electrical Nerve Stimulation (TENS, TNS)** – refers to the procedure of applying controlled, low voltage electrical pulses to the nervous system by passing electricity through the skin via electrodes placed on the skin to modify pain perception.

**Transforaminal epidural steroid injection** – administration of a steroid into the space around spinal nerve roots (epidural area), in order to provide relief of radicular pain.

**Ultrasound therapy** – refers to a deep heating modality that involves the use of high-frequency acoustic energy to produce thermal and non-thermal effects.

**Upper limb tension tests** – a physical examination maneuver done to assess cervical plexus or specific nerve root involvement in the upper limb. This consists of a combination of scapular depression, shoulder abduction with external rotation, elbow extension, forearm supination, wrist with finger extension, and cervical lateral flexion, initially done away from the tested extremity

and then toward the tested extremity. A positive sign is considered when symptoms are reproduced with contralateral cervical lateral flexion, while symptoms are diminished with ipsilateral cervical lateral flexion.

**Vestibular rehabilitation** – form of physical therapy which aims to improve deficits or alleviate symptoms resulting from balance disorders, whether peripheral or central in origin, through specific habituation and adaptation exercises.

**Western massage** – massage technique aimed at applying manual mechanical forces to the skin and deep muscles, mainly to facilitate blood flow and effect muscular relaxation. Forms of western massage include: gliding strokes (effleurage), kneading patterns (petrissage), circular pressure (deep friction), and percussion (tapotement). It is the chief type of therapeutic massage practiced in the United States.

**Whiplash-associated disease** - neck disorder resulting from an acceleration-deceleration or hyperextension-hyperflexion trauma due to a rapid change in the position of the head that imparts energy transfer to the structures of the cervical spine

# 1 Introduction

## 1.1 THE NEED FOR A GUIDELINE

Neck pain is a common issue worldwide (Côté et al 2008, Fejer et al 2006, Lidgren et al 2009). While its exact overall prevalence is difficult to determine, it is estimated to be 0.4% and 86.8% (mean: 23.1%) in the general population (Hoy et al 2010), and 6.8% in the Philippines (Manahan et al 1985). Neck pain is considered to be one of the leading musculoskeletal causes of global injury burden (Murray & Lopez 2013). It can likewise cause significant discomfort and limit a person's ability to participate in normal activities (Carroll et al 2008). Furthermore, as neck pain can be persistent and recurrent in nature (Guzman et al 2009), this increases its propensity for high economic costs at both an individual and society level with people requiring extended periods of sick leave from their usual occupations and requiring extensive use of health services (Driessen et al 2012). Therefore it is vital for clinicians to employ the principles of best evidence and best practice in their management of this condition to facilitate early return to work, improve quality of life and optimize function and outcomes for people with neck pain.

The application of evidence to guide clinical practice is a global challenge for almost all health professionals (Grol & Grimshaw 2003) and even more so in developing countries such as the Philippines where scant resources and sometimes even out of date practices are still being delivered (Agarwal et al. 2008). In South East Asia, evidence-based healthcare practices are not well established, particularly in terms of understanding evidence-based practice (EBP), development of guidelines, or application of guidelines in making decisions regarding patient care (McDonald et al. 2010, Short et al. 2010). However, there have been some pioneering initiatives in this area by medical societies in the Philippines in recent years, such as the Philippine Rheumatological Association (Guidelines for gout, osteoarthritis and osteoporosis) and the Stroke society (Guidelines for stroke) (Li-Yu et al. 2011,; Philippine Rheumatological Association 2008a,b,; Stroke Society of the Philippines 2010). Likewise, the Philippine Academy of Rehabilitation Medicine has developed clinical practice guidelines on stroke rehabilitation and low back pain, but using the approach of contextualizing relevant Western guidelines rather than de novo synthesis (Gonzalez-Suarez et al. 2011). To practice in an evidence based manner requires a clear understanding of EBP concepts, an ability to apply the concepts in practice, and a commitment to lifelong learning, all of which are still slowly in progress in the Philippines (Dizon et al. 2012, in review). In educational institutions in the Philippines, obstacles to evidence-based learning is being addressed by practical solutions such as: conducting small group, problem-based learning activities; providing critical appraisal workshops for diagnosis and treatment; and increasing role models of evidence-based medicine practitioners (Dans and Dans,2005). In terms of adherence to

evidence-based practice by clinicians in the country, present observations are inconsistent, especially regarding conformance to current Clinical Practice Guidelines (CPG). An example of this would be improved adherence to the CPG on the management of ischemic stroke in young (Espeleta et al 2011), in contrast to poor adherence to the CPG on antimicrobial prophylaxis for elective surgical procedures (Matti et al, 2002). Nevertheless, it is refreshing to see the gradually growing attention and importance being given to obtaining relevant systematic reviews, and developing of evidence-based clinical practice guidelines in developing countries including the Philippines (Garner et al, 1998). Unfortunately, there still are currently many health practices in Asia and the Philippines that are not based on current best research evidence, which may be due to limited resources (financial and intellectual), low priority being given to health research initiatives and a lack of evidence based training and skills for clinicians (Chinnock et al 2005, Agarwal et al 2008, Dizon et al, 2012, McDonald et al. 2010). With the increasing prevalence of chronic conditions, such as neck pain, it is crucial for patients to be provided with the best preventive and rehabilitative management. Therefore there is a need for locally applicable clinical guidelines to underpin evidence based practice in the Philippines.

## **1.2 CLINICAL GUIDELINES SUPPORTING EVIDENCE-BASED PRACTICE**

"Clinical practice guidelines are systematically developed statements to assist practitioners and patient decisions about appropriate health care for specific clinical circumstances" (Field & Lohr 1992). The key components of a high quality and trustworthy guideline include the following: a diverse and relevant guideline development group composition; a unanimous decision-making process; clearly-stated objectives and scope; explicitly-described methodology; use of high-quality systematic reviews for evidence analysis; statements of clear and evidence-based recommendations; the use of a rating system to link qualities of evidence to the strengths of recommendations; full disclosure of conflicts of interest, financial support and sponsoring organizations; external stakeholder review prior to publication; and declaration of an anticipated review date (Qaseem et al 2012).

Over the last 15 years, well-credentialed guideline development groups have set international standards for guideline construction (e.g. Scottish Intercollegiate Guidelines Network (SIGN), New Zealand Guidelines Group (NZGG), National Health and Medical Research Council, Australia (NHMRC), UK NHS National Institute for Clinical Excellence (NICE). These groups provide clinicians, policy-makers and clinicians with ready access to high-quality clinical guidelines on a range of topics. However, despite international investment in guideline development, there remains a lack of detail in how guidelines should be developed, the evidence reported, and recommendations worded (Turner et al. 2008). Moreover, there is inconsistent nomenclature for such documents,

with terms such as guidelines, recommendations, care pathways and protocols having different meanings in different health care and cultural settings (Kumar et al. 2010).

The GLIA group (GuideLine Implementability Appraisal) (Shiffman et al. 2005) provides advice on wording guideline recommendations to reflect the strength of the underpinning evidence, and to encourage implementation of best-evidence into practice. The ADAPTE group (from Canada and Europe) provides a guideline adaptation process to layer existing evidence underpinning existing recommendations with new literature (ADAPTE Collaboration 2007). Critical appraisal tools such as AGREE (Appraisal of Guidelines Research and Evaluation) provide criteria to assess the independence of guideline developers, the clarity of guideline purpose, its scope and end-users, the transparency of clinical questions, and how the literature was searched, appraised, extracted and synthesized, how recommendations were worded, and guidelines revised (AGREE 2010).

There is no widely-accepted approach to presenting or reporting the strength of the body of evidence underpinning guideline recommendations. Approaches include providing summaries of the evidence, reporting the evidence hierarchy and/ or methodological quality, providing reference lists, or a considered judgment of the strength of the body of evidence using a ranking (letter or number). The GRADE group (Guyatt et al. 2010) and Australia's National Health and Medical Research Council (NHMRC) FORM approach (Hillier et al. 2011) provide suggestions as to how to assess the strength of the body of evidence for guideline recommendations.

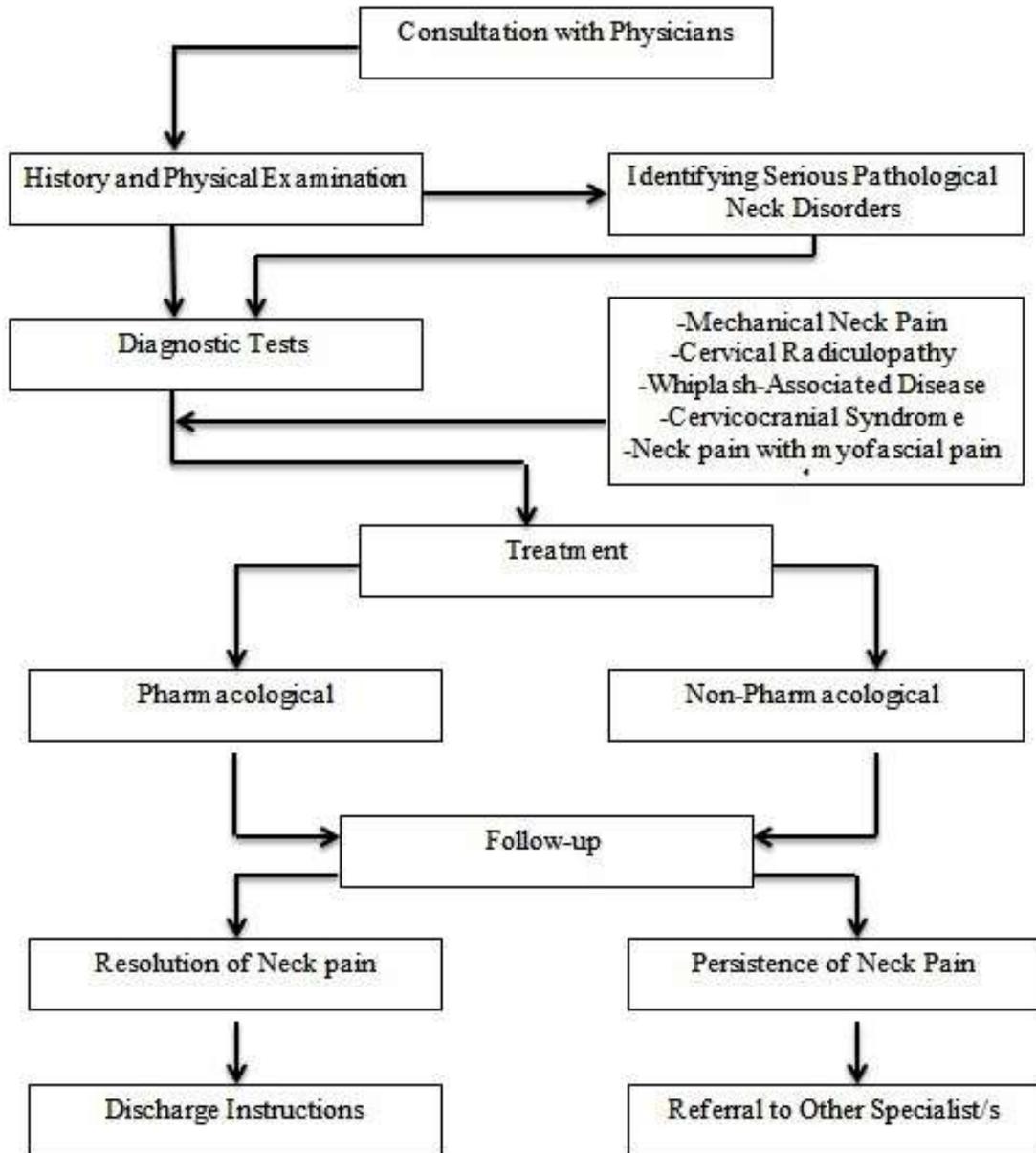
### **1.2.1 GETTING GUIDELINES INTO PRACTICE**

There is increasing research regarding the importance of guideline implementation, separate to the guideline-writing process. This research highlights that no matter how well a guideline is constructed, it will not implement itself. Planned approaches are required to embed recommendations into widespread and sustainable practice, and to evaluate the effectiveness of the guideline, in changing practice and improving health outcomes. There is also a growing body of research on adapting guidelines from Western countries for other Western countries. For instance, the ADAPTE Collaboration provides a framework on how to systematically adapt guidelines to specific cultural and organizational settings using three phases, nine modules and 24 steps (ADAPTE Collaboration 2007). However the ADAPTE framework has not been applied to resource-limited developing countries, with different healthcare systems, healthcare provider relationships and education, and patient need. It is for this reason that we propose our innovative, simple and practical approach to contextualize guidelines from developed countries, for use in the Philippines.

The production of these guidelines was based on the notion that ‘contextualization’ and ‘adaptation’ are not synonymous. Guideline writing involves semantics (ADAPTE Collaboration 2007, Kumar et al. 2010, Shiffman et al. 2005, Turner et al. 2008), where the best words are chosen to translate evidence into persuasive and adoptable clinical recommendations. The purpose behind our work was to ensure that existing high quality recommendations could be readily adopted by Filipino healthcare providers by putting them into local contexts and demonstrating their relevance. Our contextualization process fills the gap between expected (evidence-based) practice and ‘usual’ Filipino practice, by providing PARM Endorsements and PARM Context Points that should assist Filipino healthcare providers to understand what is currently the best available evidence, and to do the best they can, with local resources in their local environment, to put evidence into practice. Thus there was no intent to adapt existing guideline recommendations by rewording, revision or updating the evidence, as this process would not have achieved our purpose. There was no local expertise or even the will to do this, and we had limited resources and time. There was a far more urgent need to embed existing evidence widely to educate healthcare providers about evidence-based guidelines, improve local practices and make the best of available resources. Thus our intention in contextualizing existing recommendations was to make it simple for Filipino healthcare providers who knew little about evidence-based practice, to provide the best possible healthcare, with minimum training and least impost.

### 1.3 CLINICAL CARE PATHWAY IN NECK PAIN

The PARM guideline developers formulated this care pathway (Figure 1) to depict the relevant procedures and processes typically encountered by patients with neck pain. This flowchart served as a guide in focused selection of pertinent recommendations synthesized and contextualized in this guideline.



**Figure 1.** Example of a typical patient journey involving the evaluation, diagnosis and treatment of neck pain

## **2 METHODOLOGY**

### **2.1 PURPOSE AND SCOPE**

The team which prepared this document, comprising Rehabilitation Medicine Specialists (Physiatrists), aimed to establish evidence-based guidelines for the rehabilitation of patients suffering from acute, sub-acute and chronic neck pain. This encompassed recommendations for evaluation and diagnosis of neck pain, administration of various treatment modalities and criteria for referral to other specialists.

This guideline was therefore formulated in order to:

1. Identify appropriate clinical and diagnostic approaches to the evaluation of neck pain;
2. Determine rational pharmacologic and non-pharmacologic treatment strategies for neck pain based on current evidence, aimed at improving primary outcomes and reducing disability, and
3. Establish criteria for referral to other specialists as necessary for further management and focused care.

*End users:* Physiatrists handling patients with neck pain of varying duration.

### **2.2 GUIDELINE SEARCH PROCESS**

The following electronic databases were searched for existing international clinical practice guidelines (CPGs): PubMed, Google Scholar, National Institute for Health and Clinical Excellence (NICE), Scottish Intercollegiate Guidelines Network (SIGN), National Health and Medical Research Center (NHMRC), New Zealand Guidelines Group (NZGG), National Guidelines Clearinghouse (NGC). The key words used were: Clinical Guidelines, Practice Guidelines, neck pain, management and rehabilitation.

Inclusion criteria for the selected CPGs were:

1. Documents available in full text;
2. Published in the English language; and
3. Publication date from 2008-2013.

### **2.3 CRITICAL APPRAISAL**

Selected CPGs which met the inclusion criteria were methodologically assessed using the International Center for Allied Health Evidence (iCAHE) Guideline Appraisal Checklist. This tool is composed of 6 categories (with a total of 14 items) namely: availability (3 items), dates (3 items), underlying evidence (4 items), guideline developers (2 items),

guideline purpose/users (1 item) and ease of use (1 item) (Table 1). CPGs with scores of 10 or higher were eligible for inclusion. Only guidelines which provided a summary of their own recommendations were included in this project.

Table 1. iCAHE critical appraisal tool for clinical guidelines.

|   |
|---|
| <b>1. Availability</b>  |
| Is the guideline readily available in full text?  |
| Does the guideline provide a complete reference list?   |
| Does the guideline provide a summary of its recommendations?  |
| <b>2. Date</b>  |
| Is there a date of completion available?  |
| Does the guideline provide an anticipated review date?  |
| Does the guideline provide dates for when literature was included?  |
| <b>3. Underlying Evidence</b>   |
| Does the guideline provide an outline of the strategy they used to find underlying evidence?                                  |
| Does the guideline use a hierarchy to rank the quality of the underlying evidence?  |
| Does the guideline appraise the quality of the evidence which underpins its recommendations?                                  |
| Does the guideline link the hierarchy and quality of underlying evidence to each recommendation?                              |
| <b>4. Guideline Developers</b>  |
| Are the developers of the guideline clearly stated?   |
| Does the qualifications and expertise of the guideline developer(s) link with the purpose of the guideline and its end users? |
| <b>5. Guideline purpose and users</b>   |
| Are the purpose and target users of the guideline stated?   |
| <b>6. Ease of use</b>   |
| Is the guideline readable and easy to navigate?   |
| <b>TOTAL SCORE</b>  |

## 2.4 EXTRACTION OF RELEVANT DATA FOR CARE PATHWAY

The following data or recommendations were extracted from each guideline:

- a. History, physical examination and diagnostic evaluation tools;
- b. Pharmacological treatment options;
- c. Conservative (non-pharmacological) management;
- d. Invasive management;

- e. Surgical intervention, and
- f. Referral to other specialists and instructions for follow-up.

## **2.5 CONTEXTUALIZATION**

PARM applied the fourth and fifth elements of the NHMRC FORM tool (Hillier et al. 2011) to assess the generalizability and applicability of the included recommendations to Filipino settings. There was no consideration of the first three FORM elements of evidence strength (evidence-base, consistency and clinical impact) for any included guideline, as to do so would have violated the PARM contextualization process. Moreover, the PARM group did not assign an evidence level (A-D) to the generalizability and applicability of any PARM endorsement, although this grading is the basis of the FORM guide for de novo guideline development (Hillier et al. 2011). Rather PARM focused on discussion of generalizability and applicability of summarized recommendations, to determine whether the PARM Endorsement was sufficient to guide practice decisions, or whether PARM Context Points were also required to contextualize the endorsed recommendation(s) within the patient journey. Where there was confusion in interpreting recommendations to the Filipino patient journey, or where the included guideline recommendations were contradictory, the group went back to the original references for clarification. If required, the level of the PARM endorsement was debated and consensus achieved, with a final decision from the working group chair in the absence of consensus.

To assist in standardizing the guideline contextualization process, a PARM writing guide was established (see Box 1). This guide establishes a uniform framework for summarizing differently-worded recommendations and differently-reported strengths of the body of evidence for recommendations extracted from the included guidelines that were relevant to a particular situation in the Filipino patient journey. The Guide is to be used in the event that there are:

- more than one relevant recommendation extracted from the relevant guidelines, which addresses a particular aspect of the Filipino patient journey, and/or
- different methods of reporting the underpinning strength of the body of evidence of the relevant recommendations from the included guidelines.

**Box 1.** PARM standard writing guide.

***Key:***

High quality evidence can be variously described in the included guidelines, as Levels I or II, A or B.

Moderate quality evidence can be variously described in the included guidelines as Levels II or III, B or C.

Low quality evidence can be variously described in the included guidelines as Levels III or IV, C or D.

***Key:***

The volume of literature underpinning the recommendations was classified as low volume (3 references or less), moderate volume (4-7 references) or high volume (8+ references). Where a recommendation in the included guidelines was supported only by Good Practice Points (expert opinion in the absence of evidence, or inconsistent evidence), these were noted in the summary table as GPPs, and not given a level of evidence

Each relevant recommendation from each included guideline was assessed using the following parameters: level of evidence, uniformity of thought, and volume, consistency and age of references. The level of evidence was rated as consistent or inconsistent based on the homogeneity of the evidence level assigned by the different clinical practice guidelines. Uniformity of thought was graded as uniform or variable based on similarity of the findings of the different clinical practice guidelines as to the effectiveness or ineffectiveness of a treatment modality and reliability of diagnostic procedure or physical examination. The volume of references was graded as low if the number of references was less than or equal to three, moderate if the number was between four and seven, and high if the volume was greater than eight. The age of the references was assessed as current if 50% of the papers cited were published later than 2008 and non-current if the majority of the papers were published prior to 2008.

All recommendations relevant to the patient journey were collated in a table for each element of the journey, along with the underpinning levels of evidence, and the guideline reference from which the recommendation had been extracted. Each included recommendation set was rated according to the Philippine Academy of Rehabilitation Medicine (PARM) guide for evidence rating, outlined in Table 2.

**Table 2.** PARM guide for summarizing the underpinning strength of the body of evidence of included recommendations.

| <b>Recommendation</b>             | <b>Strength of the body of evidence</b>  |
|-----------------------------------|--|
| 1. There is strong evidence       | Consistent grades of high quality evidence with uniform thought <sup>1</sup> , and at least a moderate volume of references to support the recommendation(s)   |
| 2. There is evidence              | A mix of moderate and high quality evidence with uniform thought and at least a low volume of references OR<br>A mix of high and low quality evidence with uniform thought, and high volume of references OR<br>High level evidence coupled with GPPs, and at least moderate volume of references OR<br>One Level I paper with at least moderate volume references |
| 3. There is some evidence         | Single level II (A) paper OR<br>Inconsistent grades of high and low evidence with uniform thought and moderate volume references OR<br>Consistent grades of low level evidence with uniform thought and at least a moderate volume of references   |
| 4. There is conflicting evidence  | A mix of levels of evidence with non-uniform thought, irrespective of the volume of references with or without GPPs  |
| 5. There is insufficient evidence | Low or inconsistent levels of evidence with low volume references with or without GPPs   |
| 6. There is no evidence           | Absence of evidence for any aspect of the patient journey  |

<sup>1</sup>*'Uniform thought'* was the term coined by the PARM group to identify when differently worded recommendations from different guidelines had the same intent. This assisted PARM to resolve the issue of different wording of recommendations, despite using the same underpinning references.

## 2.6 PARM ENDORSEMENTS

PARM determined uniform wording with which to endorse recommendations based on the level of evidence (outlined in Table 3). These descriptions ranged from clear statements about efficacy for those with strong evidence (PARM strongly endorses) to those with conflicting evidence of efficacy (PARM suggests).

**Table 3.** PARM guide for writing recommendations.

|                           |   |
|---------------------------|---|
| 1. PARM strongly endorses | When there is strong evidence as determined by the criteria in the table above                      |
| 2. PARM endorses          | When there is evidence as determined by the criteria in the table above                             |
| 3. PARM recommends        | When there is some evidence as determined by the criteria in the table above                        |
| 4. PARM suggests          | When there is insufficient or conflicting evidence as determined by the criteria in the table above |
| 5. PARM does not endorse  | There is no evidence as determined by the criteria in the table above                               |

## 2.7 PARM CONTEXT POINTS

Each set of recommendations along the patient journey, for which PARM wrote an endorsement statement, was then considered in terms of generalizability and applicability to the Filipino healthcare setting. Generalizability and applicability were addressed using a novel approach, The PARM Context Points, which were written to provide a framework in which the PARM-endorsed recommendations can be applied, considering local service delivery issues of ‘how’, ‘who’, ‘when’, ‘why’, ‘what’, ‘what with’. The PARM Context Points considered aspects of the Donabedian (1988) quality framework (Structure, Process) in order to define the important elements of service delivery underpinning evidence-based care. This assisted PARM to take into account issues such as training of healthcare providers to comply with recommendations, availability of, and access to, trained healthcare providers across the Philippines, access to appropriate diagnostic and assessment processes, availability of resources and what to do when resources are unavailable, and alternative diagnostic or management approaches which could be adopted in the absence of capacity to provide guideline-recommended healthcare. This process of contextualizing recommendations to local conditions addressed the fourth pillar of evidence-based practice as discussed by Hoffmann et al (2010, Figure 1.1, p.4) (the other pillars being the research evidence, clinician reasoning and patient choice).

To assist in writing the PARM Context Points, a standard framework was developed, which outlined the elements that needed to be in place for minimum best-practice care to be provided equitably across the Philippines. Elements which addressed more advanced standard care were also considered in this framework. This aimed to provide guidance to clinicians wherever they may practice in the Philippines, regarding essential equipment, standards and resources, training and workforce, in order to provide evidence-based care.

## 2.8 GUIDELINES

A total of four guidelines were identified in the internet search which met the inclusion criteria (available in full text, published in English, and released not earlier than 2008). These were fitted to the patient journey, and all were retained as potentially useful.

After critical appraisal, the four CPGs were deemed fit for inclusion in this project. These guidelines are the following:

1. Childs JD, Cleland JA, Elliott JM, Teyhen DS, Wainner RS, Whitman JM, Sopky BJ, Godges JJ, Flynn TW; American Physical Therapy Association. ***Neck pain: Clinical practice guidelines linked to the International Classification of Functioning, Disability, and Health from the Orthopedic Section of the American Physical Therapy Association.*** J Orthop Sports Phys Ther. 2008 Sep;38(9):A1-A34. Epub 2008 Sep 1.  
[www.jospt.org/issues/articleID.1454,type.2/article\\_detail.asp](http://www.jospt.org/issues/articleID.1454,type.2/article_detail.asp)
2. TracSA 2008. ***Clinical guidelines for best practice management of acute and chronic whiplash-associated disorders.*** Canberra: National Health and Medical Research Council of Australia, 2008.  
[http://www.nhmrc.gov.au/files\\_nhmrc/publications/attachments/cp112.pdf](http://www.nhmrc.gov.au/files_nhmrc/publications/attachments/cp112.pdf)
3. Brosseau L, Wells GA, Tugwell P, Casimiro L, Novikov M, Loew L, Sredic D, Clément S, Gravelle A, Hua K, Kresic D, Lakic A, Ménard G, Côté P, Leblanc G, Sonier M, Cloutier A, McEwan J, Poitras S, Furlan A, Gross A, Dryden T, Muckenheim R, Côté R, Paré V, Rouhani A, Léonard G, Finestone HM, Laferrière L, Dagenais S, De Angelis G, Cohoon C. ***Ottawa Panel evidence-based clinical practice guidelines on therapeutic massage for neck pain.*** J Bodyw Mov Ther. 2012 Jul;16(3):300-25.
4. Bono CM, Ghiselli G, Gilbert TJ, Kreiner DS, Reitman C, Summers JT, Baisden JL, Easa J, Fernand R, Lamer T, Matz PG, Mazanec DJ, Resnick DK, Shaffer WO, Sharma AK, Timmons RB, Toton JF; North American Spine Society (NASS). ***An evidence-based clinical guideline for the diagnosis and treatment of cervical radiculopathy from degenerative disorders.*** Burr Ridge (IL): North American Spine Society (NASS); 2010.  
[http://www.spine.org/Documents/Cervical\\_Radiculopathy.pdf](http://www.spine.org/Documents/Cervical_Radiculopathy.pdf)

### 2.8.1 RESULTS

The four included clinical practice guidelines were critically appraised using the iCAHE tool. The iCAHE scores of the guidelines, shown in Table 4, qualified them for use as reference guidelines in our project. Appendix 1 shows the full methodology of scores for each included CPG.

**Table 4.** iCAHE scores of the included clinical practice guidelines and the assigned tag used in the PARM neck pain guideline.

| <b>Clinical practice guideline</b>    | <b>Year</b> | <b>iCAHE score</b> | <b>Assigned tag in PARM CPG</b> |
|---------------------------------------|-------------|--------------------|---------------------------------|
| American Physical Therapy Association | 2008        | 14                 | APTA                            |
| Trauma and Injury Recovery            | 2008        | 13                 | TracSA                          |
| North American Spine Society          | 2011        | 12                 | NASS                            |
| Ottawa Panel                          | 2012        | 11                 | Ottawa                          |

### 2.8.2 GUIDELINE CLASSIFICATION OF EVIDENCE STRENGTH

The tables below (Tables 5 to 9 inclusive) provide an outline of the levels of evidence and recommendation grades used by each of the clinical practice guidelines included.

**Table 5.** APTA guideline classification of evidence strength. Taken from Childs, et al. (2008).

| <b>Grades of recommendation</b> |   |  |
|---------------------------------|---|--|
| A                               | Strong Evidence   | A preponderance of level I and/or level II studies support the recommendation. This must include at least 1 level I study                              |
| B                               | Moderate Evidence   | A single high-quality randomized controlled trial or a preponderance of level II studies support the recommendations                                   |
| C                               | Weak Evidence   | A single level II study or a preponderance of level III and IV studies including statements of consensus by content experts support the recommendation |
| D                               | Conflicting Evidence  | Higher quality studies conducted on this topic disagree with respect to their conclusions. The recommendation is based on these conflicting studies    |
| E                               | Theoretical/Foundational Evidence   | A preponderance of animal or cadaver studies, from conceptual models/principles, or from basic sciences/bench research support this recommendation     |
| F                               | Expert Opinion  | Best evidence based on the clinical practice of the guidelines development team  |
| <b>Levels of evidence</b>       |   |  |
| I                               | Evidence obtained from high-quality randomized controlled trials, prospective trials, or diagnostic studies   |  |
| II                              | Evidence obtained from lesser quality randomized controlled trials, prospective studies, prospective studies or diagnostic studies (e.g. improper randomization, no blinding, <80% follow-up) |  |
| III                             | Case controlled studies or retrospective studies  |  |
| IV                              | Case series   |  |
| V                               | Expert opinion  |  |

**Table 6.** TracSA guideline classification of evidence strength. Taken from TracSA (2009).

| <b>Grade of recommendations</b> |   |
|---------------------------------|---|
| A                               | Body of evidence can be trusted to guide practice   |
| B                               | Body of evidence can be trusted to guide practice in most situation                                       |
| C                               | Body of evidence provides some support for recommendation (s) but care should be taken in its application |
| D                               | Body of evidence is weak and recommendation must be applied with caution                                  |
| <b>Evidence source</b>          |   |
| I                               | A systematic review of level II studies   |
| II                              | A randomized controlled trial   |
| III-1                           | A pseudo-randomized controlled trial (i.e. alternate allocation or some other method)                     |
| III-2                           | A comparative study with concurrent controls  |
| III-3                           | A comparative study without concurrent controls   |
| IV                              | Case series with either post-test or pre-test / post-test outcomes  |

**Table 7.** Ottawa guideline classification of evidence strength. Taken from TOP (2009).

| <b>Grade of recommendations</b> |  |   |
|---------------------------------|--|---|
| A                               | Strongly recommended                     | RCT (single or meta-analysis)   |
| B                               |  | CCT or observational (single or meta-analysis)                            |
| C+                              | Suggested use                            | RCT/CCT or observational (single or meta-analysis)                        |
| C                               | Neutral                                  | Any study design  |
| D                               | Neutral                                  | Any study design  |
| D+                              | Suggested no use                         | RC/CCT or observational (single or meta-analysis)                         |
| D-                              | Strongly not recommended                 | Well-designed RCT with >100 patients (if <100 patients becomes a Grade D) |
| <b>Evidence source</b>          |  |   |
| I                               | At least one randomized controlled study |   |
| II                              | Non-randomized controlled study          |   |

**Table 8.** NASS guideline classification of evidence strength. Taken from Bono, et al. (2011).

| <b>Grade of recommendations</b> |   |
|---------------------------------|---|
| A                               | Good evidence (Level I studies with consistent findings) for or against recommending intervention   |
| B                               | Fair evidence (Level II or III studies with consistent findings) for or against recommending intervention   |
| C                               | Poor quality evidence (Level IV or V studies) for or against recommending intervention  |
| I                               | Insufficient or conflicting evidence not allowing a recommendation for or against intervention  |
| <b>Evidence source</b>          |   |
| I                               | <ul style="list-style-type: none"> <li>• High quality randomized trial with statistically significant difference or no statistically significant difference but narrow confidence intervals</li> <li>• Systematic review of Level I RCTs (and study results were homogenous)</li> </ul> |
| II                              | <ul style="list-style-type: none"> <li>• Lesser quality RCT (e.g., &lt;80% follow-up, no blinding, or improper randomization)</li> <li>• Prospective comparative study</li> <li>• Systematic review of Level II studies or Level I studies with inconsistent results</li> </ul>         |
| III                             | <ul style="list-style-type: none"> <li>• Case control study</li> <li>• Retrospective comparative study</li> <li>• Systematic review of Level III studies</li> </ul>   |
| IV                              | Case series   |
| V                               | Expert opinion  |

**Table 9.** A summary of the low and high evidence ratings for each of the included clinical guideline practices.

| <b>Guideline</b> | <b>Low evidence</b>           | <b>High evidence</b> |
|------------------|-------------------------------|----------------------|
| APTA             | C, D, E, F, III, IV, V, VI    | A, B, I, II          |
| TracSA           | C, D, III-1, III-2, III-3, IV | A, B, I, II          |
| Ottawa           | C, D, D+, D-, II              | A, B, C+, I          |
| NASS             | C, I, III, IV, V              | A, B, I, II          |

## 2.9 FILLING THE GAPS

During the discussions among the developers, some potential obstacles or deficiencies to the proper implementation of the guidelines were determined. Primarily, the health care delivery system in the Philippines is usually centered in the urban areas in different provinces. Rehabilitation Medicine centers in these cities is generally more equipped, especially in terms of diagnostic facility, highly-specialized therapeutic interventions and subspecialty care. While the availability of more specialized interventional methods is scarce in the rural areas, owing to lack of equipment or experience, it is imperative that all physiotherapy centers have the basic modalities for pain relief, such as thermal agents, traction machines and electrotherapeutic devices. Likewise, emphasis is given to the role of meticulous clinical assessment and diagnostic evaluation of patients for prompt and appropriate classification of neck pain etiology. The role of therapeutic exercises and continuation of usual activity are also reported as important components in the management of neck pain. If the need arises for specialized diagnostic modalities, invasive treatment or surgical intervention (which are currently only available in the urban areas), every physiatrist must know when it is clinically-sound to have the necessary equipment installed, or when to refer to suitable specialists in order to save patients time and financial resources which would otherwise be spent on unnecessary travel to the city.

Also, it has been observed that the knowledge on evidence based practice (EBP) of neck pain among PARM members is minimal. They must therefore be well-versed with the principles of EBP to ensure successful implementation of the CPGs. It is suggested that all PARM members acquire appropriate training on the concepts and application of EBP through seminars and workshops.

## **2.10 PUBLIC CONSULTATION**

Public consultation of the draft document was undertaken from January 2014 to December 2014.

The manuscript was disseminated electronically to members of the Philippine Academy of Rehabilitation Medicine for evaluation and review. Different training institutions of rehabilitation medicine, namely Philippine General Hospital (PGH), Philippine Orthopedic Center (POC), University of Santo Tomas Hospital (USTH), and Veterans Memorial Medical Center (VMMC), were made aware of the said document, in order to facilitate ease of internal consultation.

Copies of the manuscript and a feedback form were likewise circulated to different professional organizations such as the Philippine College of Physicians (PCP), Philippine Orthopedic Association (POA), Philippine Academy of Family Physicians (PAFP), and Philippine Physical Therapy Association (PPTA). The above organizations were given the opportunity to comment on the PARM CPG, and issues to do with uptake and application.

Modifications to the documents were made according to the relevant comments and suggestions received by November 2014.

## **2.11 IMPLEMENTATION PLANS**

Following public consultation, modification and finalization of the clinical practice guidelines, the guidelines will be disseminated to personnel who are involved in the rehabilitation of patients with neck pain. Strategies were identified by PARM neck pain CPG developers in order for the guidelines to be implemented effectively at the local level.

Strategies for the dissemination and implementation of the neck pain guideline in the Philippine medical system are the following:

1. Endorsement by:

- The Department of Health (DOH), Philippine Council for Health Research and Development (PCHRD), and Philippine Health Insurance Corporation (PHIC)
- Relevant professional associations: Philippine Academy of Rehabilitation Medicine (PARM), Philippine College of Physicians (PCP), Philippine Academy of Family Physicians (PAFM), Philippine Physical Therapy Association (PPTA)

- Key training institutions: Philippine General Hospital (PGH), Philippine Orthopedic Center (POC), University of Santo Tomas Hospital (USTH) and Veterans Memorial Medical Center (VMMC)
- Drug companies (if relevant)

2. A clear outlined description of the process undertaken by PARM should be provided, using posters, webpages and short interviews

3. Public awareness: Media release prepared by PARM and newspaper articles

4. Professional awareness

- Conference presentations: PARM Quarterly Convention in May 2015 and a future Philippine Medical Association (PMA) Convention
- A minimum of one peer-reviewed publication (as well as one publication outlining the methodology), sent to BMC Research Methodology. The title of article is “Correspondence: A process for contextualizing published clinical guidelines for a developing country.”
- Short articles in professional newsletters and magazines
- Freely-accessible website providing details on the CPG and on Evidence-Based Practice (EBP) in general, which can be accessed by health professionals and target end-users.
- Short forms of the guideline developed, for dissemination to all psychiatrists and relevant allied health professionals (laminated form for desktop use, or as wall charts, etc.) and consumer guides

5. Professional champions: Key professional people from PARM to promote the guidelines widely

6. Education: Education sessions provided widely in PARM and for other health provider groups on Evidence Based Practice (EBP), guideline development (in general), measurement of health outcomes and the future of EBP in the Philippines, not only to support this guideline, but other future guideline developments

## **2.12 DATE OF PRODUCTION:**

April 2013 – December 2013 (Guideline Development Phase)

January 2014 – December 2014 (Guideline Consultation Phase)

January 2015– Official Release of Guideline

## **2.13 EXPECTED DATE OF REVISION: 2017**

## 2.14 GUIDELINE DEVELOPERS

The PARM working committee on this guideline is composed of the following members:

|                                 |                                  |   |
|---------------------------------|----------------------------------|---|
| <b>Project Leader</b>           | Ephraim DV. Gambito, MD          | <ul style="list-style-type: none"><li>• University of Santo Tomas Hospital, Manila</li></ul>  |
| <b>Assistant Project Leader</b> | Kenneth Chester V. Corpus, MD    | <ul style="list-style-type: none"><li>• University of Santo Tomas Hospital, Manila</li><li>• Salve Regina Medical Center, Marikina City</li></ul> |
| <b>Advisers</b>                 | Karen Grimmer-Somers, PhD        | <ul style="list-style-type: none"><li>• International Center for Allied Health Evidence (iCAHE), University of South Australia</li></ul>          |
|                                 | Consuelo B. Gonzalez-Suarez, MD  | <ul style="list-style-type: none"><li>• University of Santo Tomas Hospital, Manila</li></ul>  |
| <b>Members</b>                  | Michelle O. Beluso-Almeida, MD   | <ul style="list-style-type: none"><li>• Capiz Emmanuel Hospital, Roxas City</li></ul>   |
|                                 | Carmelo L. Barcenas, MD          | <ul style="list-style-type: none"><li>• Cebu Doctors' University Hospital, Cebu City</li></ul>  |
|                                 | Elda Grace G. Anota-Canencia, MD | <ul style="list-style-type: none"><li>• Perpetual Succor Hospital, Cebu City</li></ul>  |
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|                                 | Margret Lee C. Licup, MD         | <ul style="list-style-type: none"><li>• The Medical City – Iloilo, Iloilo City</li></ul>  |
|                                 | Lynn L. Olegario, MD             | <ul style="list-style-type: none"><li>• Silliman University Medical Center, Dumaguete City</li></ul>  |
|                                 | Atanasia A. Siva, MD             | <ul style="list-style-type: none"><li>• West Visayas State University Medical Center, Iloilo City</li></ul>                                       |
|                                 | Marcelle Theresa G. Zamora, MD   | <ul style="list-style-type: none"><li>• University of Santo Tomas Hospital, Manila</li></ul>  |
| <b>Guideline editor</b>         | Louise Wiles, PhD                | <ul style="list-style-type: none"><li>• International Centre for Allied Health Evidence (iCAHE), University of South Australia</li></ul>          |

# 3 Evaluation and Diagnosis of Neck Pain: Medical History

Neck pain is a prevalent musculoskeletal condition, entailing much demand for medical resources, and is a major cause of physical, psychological and social disability. A complete and focused medical history and physical examination is important in the evaluation of low back pain to determine the cause of the symptoms. Patient’s responses and findings may raise suspicion of serious underlying condition. Imaging of the cervical spine and other diagnostic exams may be used in the evaluation of cervical pain for specific neck pathologies.

## 3.1 PATHOANATOMICAL FEATURES

**Table 10.** Pathoanatomical features in neck pain diagnosis

| Recommendation  | Guideline | Level of Evidence | Reference  |
|---|-----------|-------------------|--|
| There is evidence that in patients presenting with neck pain, the clinician should assess for functional impairments of pathological neuromuscular and connective tissues, such as mechanical neck pain and degenerative disorders or herniated cervical discs resulting to cervical radiculopathy and cervical compressive myelopathy. | APTA      | II (E)            | Boden et al, 1990<br>Kriss & Kriss, 2000<br>Payne, 1987<br>Van Saase et al, 1989<br>Radhakrishnan et al, 1994<br>Bernhardt et al, 1993<br>Bogduk & Marsland, 1988<br>Cloward, 1959<br>Hoving et al, 2002 |
| High volume – Non-current   |           |                   |  |

- PARM endorses that clinicians should assess for functional impairments of pathological neuromuscular and connective tissues, such as mechanical neck pain and degenerative disorders or cervical discs resulting to cervical radiculopathy and cervical compressive myelopathy.

### 3.2 RISK FACTORS FOR CHRONIC NECK PAIN

**Table 11.** Risk factors in chronic neck pain

| Recommendation  | Guideline | Level of Evidence | Reference   |
|---|-----------|-------------------|---|
| There is some evidence to consider the following as risk factors for the development of chronic neck pain: age >40 years, coexisting low back pain, regular cycling activity, decrease in hand strength, poor quality of life, and reduced vitality | APTA      | II (B)            | Bot et al, 2005<br>Hill et al, 2004<br>Hoving et al, 2004 |
| Low volume – Non-current  |           |                   |   |

- PARM recommends the following as risk factors for the development of chronic neck pain: age >40 years, coexisting low back pain, regular cycling activity, decrease in hand strength, poor quality of life, and reduced vitality.

### 3.3 PSYCHOSOCIAL RISK FACTORS

**Table 12.** Considering psychosocial risk factors in neck pain

| Recommendation   | Guideline | Level of Evidence | Reference  |
|--|-----------|-------------------|--|
| There is evidence that clinicians must be aware of psychosocial factors, in addition to medical conditions, which may be contributory to a patient’s persistent pain and disability, and lead to the transition of an acute condition to a chronic, disabling condition. | APTA      | II (B)            | Fritz and George, 2002<br>Fritz and George, 2001<br>Linton, 2000<br>Sieben et al, 2005<br>George et al, 2001 |
| Moderate volume – Non-current  |           |                   |  |

- PARM endorses that clinicians must be aware of psychosocial factors, in addition to medical conditions, which may be contributory to a patient’s persistent pain and disability, and lead to the transition of an acute condition to a chronic, disabling condition.

### 3.4. IDENTIFYING AND REFERRING SERIOUS NECK CONDITIONS

**Table 13.** Identifying and referring serious neck conditions

| Recommendation  | Guideline | Level of Evidence | Reference   |
|---|-----------|-------------------|---|
| There is some evidence that clinicians must be aware of key signs and symptoms associated with serious pathological neck conditions, and immediately refer to appropriate medical practitioners when potentially serious medical disease is suspected, such as cervical myelopathy, cervical instability, fracture, neoplastic conditions, vascular compromise or systemic disease. | APTA      | III (B)           | Delfini et al, 1999<br>Hoffman et al, 2007<br>Jett, 2003<br>Robinson et al, 2003<br>Snyder et al, 1993<br>Spengler et al, 1973<br>Silbert et al, 1995<br>Attia et al, 1999<br>Bruce et al, 2001 |
| High volume – Non-current   |           |                   |   |

- PARM recommends that clinicians must be aware of key signs and symptoms associated with serious pathological neck conditions, and immediately refer to appropriate medical practitioners when potentially serious medical disease is suspected, such as cervical myelopathy, cervical instability, fracture, neoplastic conditions, vascular compromise or systemic disease.

### 3.5. ASSESSING NECK TRAUMA

**Table 14.** Assessing neck trauma

| Recommendation  | Guideline | Level of Evidence | Reference                                  |
|---|-----------|-------------------|--|
| There is evidence that patients with neck pain who report a history of trauma must be assessed for the presence of cervical instability, spinal fracture and potential spinal cord or brainstem injury. The Canadian Cervical Spine Rule (CCR) for radiography may be used in classifying patients who are low risk or high risk. | APTA      | I (B)             | Stiell et al, 2001                         |
|   | TRACsa    | B                 | Stiell et al, 2001<br>Bandiera et al, 2003 |
| Consistent level of evidence – Low volume – Non-current – Uniform thought   |           |                   |  |

- PARM endorses that patients with neck pain who report a history of trauma must be assessed for the presence of cervical instability, spinal fracture and potential spinal cord or brainstem injury. The Canadian Cervical Spine Rule (CCR) for radiography may be used in classifying patients who are low risk or high risk.

## 4 Mechanical Neck Pain

Mechanical neck pain (cervicalgia) affects 45-54% of the population at some point of their lives and can result in severe disability. It is one of the most common neck conditions found in clinical practice. It is due to a muscle strain or a ligament sprain of the cervical spine. Loss of normal cervical joint play may result in mechanical neck pain. It is a viscous cycle that results in decreased joint play, which leads into muscle imbalance, weakness, and spasms leading to stress over the cervical joints.

### 4.1. CLASSIFYING ACUTE MECHANICAL NECK PAIN

**Table 15.** Classifying acute mechanical neck pain

| Recommendation   | Guideline | Level of Evidence | Reference   |
|--|-----------|-------------------|---|
| There is evidence that the diagnosis of cervicalgia (acute mechanical neck pain) can be made with reasonable certainty when the patient presents with the following findings: younger individual (age <50 years), acute neck pain (<12 weeks duration), symptoms isolated to the neck, restricted range of motion. | APTA      | I (B)             | Cleland et al, 2007<br>Fritz and Brennan, 2007<br>Hoving et al, 2002<br>Tseng et al, 2006 |
| Moderate volume – Non-current  |           |                   |   |

- PARM endorses that the diagnosis of cervicalgia (acute mechanical neck pain) can be made with reasonable certainty when the patient presents with the following findings: younger individual (age <50 years), acute neck pain (<12 weeks duration), symptoms isolated to the neck, restricted range of motion.

### 4.2. OUTCOME MEASURES FOR NECK PAIN IN GENERAL

**Table 16.** Outcome measures for neck pain in general

| Recommendation  | Guideline | Level of Evidence | Reference   |
|---|-----------|-------------------|---|
| There is evidence that clinicians should use validated self-report questionnaires such as the Neck Disability Index (NDI) and Patient-Specific Functional Scale (PSFS) to record baseline symptom status in patients with neck pain, and monitor changes in pain, function and disability throughout the course of treatment. | APTA      | I (A)             | Pietrobon, 2002<br>Vernon and Mior, 1991<br>Riddle & Stratford, 1998<br>Jette and Jette, 1996<br>Stratford et al, 1999<br>Westway et al, 1998<br>Jaeschke et al, 1989<br>Cleland et al, 2008<br>Westaway et al, 1998<br>Stratford et al, 1995 |
| High volume – Non-current   |           |                   |   |

- PARM endorses that clinicians should use validated self-report questionnaires such as the Neck Disability Index (NDI) and Patient-Specific Functional Scale (PSFS) to record baseline symptom status in patients with neck pain, and monitor changes in pain, function and disability throughout the course of treatment.

### 4.3. MANAGEMENT OF MECHANICAL NECK PAIN

#### 4.3.1. Acute Mechanical Neck Pain

##### 4.3.1.1. Cervical manipulation, Thoracic Manipulation, Cervical Traction

**Table 17.** Cervical manipulation, thoracic manipulation and cervical traction for acute mechanical neck pain

| Recommendation   | Guideline | Level of Evidence | Reference  |
|--|-----------|-------------------|--|
| There is some evidence for the use of cervical manipulation in the management of acute mechanical neck pain                            | APTA      | I (A)             | Gross et al, 2004<br>Gross et al, 2007                               |
| Low volume – Non-current   |           |                   |  |
| There is some evidence for the role of thoracic manipulation in the management of acute mechanical neck pain                           | APTA      | I (C)             | Cleland et al, 2005<br>Savolainen et al, 2004<br>Cleland et al, 2007 |
| Low volume – Non-current   |           |                   |  |
| There is some evidence for the usefulness of mechanical intermittent cervical traction in the management of acute mechanical neck pain | APTA      | I (B)             | Graham et al, 2006   |
| Low volume – Non-current   |           |                   |  |

- PARM recommends cervical manipulation, thoracic manipulation and mechanical intermittent cervical traction in the treatment of acute mechanical neck pain.

#### 4.3.2. Sub-acute Mechanical Neck Pain

##### 4.3.2.1. Western Massage

**Table 18.** Western massage for sub-acute mechanical neck pain

| Recommendation   | Guideline | Level of Evidence | Reference          |
|--|-----------|-------------------|--------------------|
| There is some evidence for the usefulness of western massage in the management of sub-acute mechanical neck pain | Ottawa    | I (C)             | Inrich et al, 2001 |
| Low volume – Non-current   |           |                   |                    |

- PARM recommends western massage in the management of sub-acute mechanical neck pain.

### 4.3.3. Chronic Mechanical Neck Pain

#### 4.3.3.1. Therapeutic Exercises: Flexibility/Stretching, Coordination, Strengthening, Endurance Exercises

**Table 19.** Therapeutic exercises for chronic mechanical neck pain

| Recommendation   | Guideline | Level of Evidence        | Reference  |
|--|-----------|--------------------------|--|
| There is insufficient evidence for prescribing flexibility/stretching exercises in chronic mechanical neck pain for key muscles related to the lower cervical and upper thoracic spine, such as the anterior, medial, and posterior scalenes, upper trapezius, levator scapulae, pectoralis minor, and pectoralis major. | APTA      | V (C)                    | Ylinen et al, 2007   |
| Low volume – Non-current   |           |                          |  |
| There is evidence for deep neck flexors strengthening, coordination and endurance exercises for patients with chronic mechanical neck pain.  | APTA      | I<br>I<br>I<br>II<br>(A) | Ylinen et al, 2003<br>Taimela et al, 2000<br>Kay et al, 2005<br>Sarig-Bahat 2003 |
| Moderate volume – Non-current  |           |                          |  |

- PARM endorses prescribing deep neck flexor strengthening, coordination and endurance exercises for chronic mechanical neck pain.
- PARM suggests prescribing flexibility/stretching exercises (such as for the lower cervical and upper thoracic spine, such as the anterior, medial, and posterior scalenes, upper trapezius, levator scapulae, pectoralis minor, and pectoralis major) in patients with chronic mechanical neck pain.

#### 4.3.3.2. Cervical manipulation, Thoracic Manipulation, Cervical Traction

**Table 20.** Cervical manipulation, thoracic manipulation and cervical traction in chronic mechanical neck pain

| Recommendation   | Guideline | Level of Evidence | Reference  |
|--|-----------|-------------------|--|
| There is some evidence for the use of cervical manipulation in the management of chronic mechanical neck pain  | APTA      | I (A)             | Gross et al, 2004<br>Gross et al, 2007                               |
| Low volume – Non-current   |           |                   |  |
| There is some evidence for the role of thoracic manipulation in the management of chronic mechanical neck pain | APTA      | I (C)             | Cleland et al, 2005<br>Savolainen et al, 2004<br>Cleland et al, 2007 |
| Low volume – Non-current   |           |                   |  |

|   |      |       |                       |
|---|------|-------|-----------------------|
| There is some evidence for the use of mechanical intermittent cervical traction in the management of chronic mechanical neck pain | APTA | I (B) | Joghataei et al, 2004 |
| Low volume – Non-current  |      |       |                       |

- PARM recommends cervical manipulation, thoracic manipulation and mechanical intermittent cervical traction in the treatment of chronic mechanical neck pain.

#### 4.3.3.3. Massage: Traditional Chinese, Western Massage, Swedish Massage

**Table 21.** Traditional Chinese, Western Massage, Swedish Massage for chronic mechanical neck pain

| Recommendation   | Guideline | Level of Evidence | Reference           |
|--|-----------|-------------------|---------------------|
| There is some evidence for the role of Traditional Chinese Massage in improving pain and mobility for patients with chronic mechanical neck pain | Ottawa    | I (B/C+)          | Cen et al, 2003     |
| Low volume – Non-current   |           |                   |                     |
| There is some evidence for the usefulness of Western Massage in the management of chronic mechanical neck pain                                   | Ottawa    | I (C)             | Inrich et al, 2001  |
| Low volume – Non-current   |           |                   |                     |
| There is some evidence for the use of Swedish Massage in the management of chronic mechanical neck pain  | Ottawa    | I (C+)            | Sherman et al, 2009 |
| Low volume – Non-current   |           |                   |                     |

- PARM recommends massage (traditional Chinese massage, Western massage, Swedish massage) in the treatment of chronic mechanical neck pain.

#### 4.4 PARM CONTEXT POINTS FOR MECHANICAL NECK PAIN

**Table 22.** Context points for minimum and additional standard care of practice for management of mechanical neck pain.

|  | <b>Minimum standard care of practice</b>   | <b>Additional standard care of practice</b>  |
|--|--|--|
| Practice method  | <ul style="list-style-type: none"> <li>• History-taking</li> <li>• Physical examination</li> <li>• Functional monitoring:               <ul style="list-style-type: none"> <li>-NDI</li> <li>-PSFS</li> </ul> </li> <li>• Therapeutic exercises<sup>c</sup> (flexibility/stretching, coordination, strengthening, endurance exercises)</li> <li>• Massage:               <ul style="list-style-type: none"> <li>-Western<sup>b,c</sup></li> <li>-Traditional Chinese<sup>c</sup></li> <li>-Swedish<sup>c</sup></li> </ul> </li> <li>• Intermittent mechanical cervical traction<sup>a,c</sup></li> </ul> | <ul style="list-style-type: none"> <li>• cervical manipulation<sup>+ a,c</sup></li> <li>• thoracic manipulation<sup>+ a,c</sup></li> </ul> |
| Workforce  | <ul style="list-style-type: none"> <li>• Physiatrist</li> <li>• Physical therapist</li> </ul>  | <ul style="list-style-type: none"> <li>• Physiatrist</li> <li>• Physical therapist trained in cervical/thoracic manipulation</li> </ul>    |
| Resources  | <ul style="list-style-type: none"> <li>• Physical therapy room</li> </ul>  | <ul style="list-style-type: none"> <li>• Physical therapy room</li> </ul>  |
| Training   | <ul style="list-style-type: none"> <li>• Within competency</li> </ul>  | <ul style="list-style-type: none"> <li>• Within competency</li> </ul>  |
| When is it done  | <ul style="list-style-type: none"> <li>• Upon consultation</li> </ul>  | <ul style="list-style-type: none"> <li>• Upon consultation</li> </ul>  |
| Reassessment using at least one standard outcome measure | <ul style="list-style-type: none"> <li>• Four to six weeks</li> </ul>  | <ul style="list-style-type: none"> <li>• Four to six weeks</li> </ul>  |

<sup>a</sup> for acute mechanical neck pain

<sup>b</sup> for sub-acute mechanical neck pain

<sup>c</sup> for chronic mechanical neck pain

<sup>+</sup>Spinal manipulation and/or Spinal Mobilization should be given only by a professional who is registered to practice in the Philippines (i.e. physician, PT), with recognized and credible training, approved by any of the following: Professional Regulation Commission (PRC), Department of Health (DOH), or their respective professional organization/s; and can provide documented evidence of safe and evidence-based practice.

# 5 Cervical Radiculopathy

Cervical radiculopathy is a physiological dysfunction of the cervical nerve roots, commonly caused by space-occupying lesions like osteophytes or herniated cervical discs, which may be secondary to degenerative processes, and resulting to neck pain associated with neurological signs and symptoms. Common signs and symptoms would include referred pain to upper extremity, neck pain, numbness or sensory changes, weakness or abnormal deep tendon reflexes in the arm, headache and chest or breast pains. It is important for the clinician to distinguish between purely axial cervical pain and cervical radicular pain, as these two are different entities that will require different types of treatment.

## 5.1. CLASSIFYING CERVICAL RADICULOPATHY

### 5.1.1. Typical Symptoms of Cervical Radiculopathy

**Table 23.** Typical symptoms of cervical radiculopathy

| Recommendation   | Guideline | Level of Evidence    | Reference   |
|--|-----------|----------------------|---|
| There is strong evidence that the diagnosis of cervical radiculopathy can be considered when the patient presents with radicular findings or referred pain to the upper extremity. | APTA      | II (B)               | Voyvodic, 1997  |
|  | NASS      | II<br>I<br>II<br>(B) | Henderson et al, 1983<br>Post et al, 2006<br>Yoss et al, 1957 |
| Consistent level of evidence – Moderate volume – Non-current – Uniform thought   |           |                      |   |

- PARM strongly endorses that the diagnosis of cervical radiculopathy can be considered when the patient presents with radicular findings or referred pain to the upper extremity.

### 5.1.2. Atypical Symptoms of Cervical Radiculopathy

**Table 24.** Atypical symptoms of cervical radiculopathy

| Recommendation   | Guideline | Level of Evidence                        | Reference  |
|--|-----------|--|--|
| There is some evidence that the diagnosis of cervical radiculopathy may be considered in patients with atypical signs and symptoms such as deltoid muscle weakness, scapular winging, hand intrinsic muscle weakness, chest or breast pain, and headaches. | NASS      | II<br>IV<br>IV<br>IV<br>III<br>IV<br>(B) | Henderson et al, 1983<br>Chang et al, 2003<br>Makin et al, 1986<br>Ozgur & Marshall, 2003<br>Persson et al, 2007<br>Post et al, 2006 |
| Moderate volume – Non-current  |           |  |  |

- PARM recommends that the diagnosis of cervical radiculopathy may be considered in patients with atypical signs and symptoms such as deltoid muscle weakness, scapular winging, hand intrinsic muscle weakness, chest or breast pain, and headaches.

## 5.2. PHYSICAL EXAMINATION OF CERVICAL RADICULOPATHY

### 5.2.1. Neurological Testing for Cervical Radiculopathy

**Table 25.** Neurological testing for cervical radiculopathy

| Recommendation  | Guideline | Level of Evidence           | Reference   |
|---|-----------|-----------------------------|---|
| There is some evidence that the diagnosis of cervical radiculopathy may be considered in patients with numbness, sensory changes, weakness or abnormal deep tendon reflexes in the arm. | NASS      | II<br>IV<br>II<br>IV<br>(B) | Henderson et al, 1983<br>Jenis & An, 2000<br>Yoss et al, 1957<br>Post et al, 2006 |
| Moderate volume – Non-current   |           |                             |   |

- PARM recommends that the diagnosis of cervical radiculopathy may be considered in patients with numbness, sensory changes, weakness or abnormal deep tendon reflexes in the arm.

### 5.2.2. Special tests for Cervical Radiculopathy

**Table 26.** Special tests for cervical radiculopathy

| Recommendation   | Guideline | Level of Evidence                  | Reference   |
|--|-----------|------------------------------------|---|
| There is some evidence that the diagnosis of cervical radiculopathy may be evaluated using provocative tests such as Spurling’s maneuver or upper limb tension tests | APTA      | II (B)                             | Voyvodic, 1997  |
|  | NASS      | III<br>II<br>IV<br>IV<br>II<br>(C) | Davidson et al, 1981<br>Shah & Rajshekhar, 2004<br>Tong et al, 2002<br>Wainner et al, 2003<br>Bertilson et al, 2003 |
| Inconsistent level of evidence - Moderate volume – Non-current – Uniform thought   |           |                                    |   |

- PARM recommends that the diagnosis of cervical radiculopathy may be evaluated using provocative tests such as Spurling’s maneuver or upper limb tension tests.

### 5.3. ANCILLARY AND DIAGNOSTIC TESTS FOR CERVICAL RADICULOPATHY

#### 5.3.1. Computed Tomography (CT), CT Myelography and Magnetic Resonance Imaging (MRI)

**Table 27.** Computed Tomography (CT), CT Myelography and Magnetic Resonance Imaging (MRI) for cervical radiculopathy

| Recommendation  | Guideline | Level of Evidence                                   | Reference   |
|---|-----------|---|---|
| There is some evidence that dermatomal arm pain alone is not specific in identifying pathological levels for patients with cervical radiculopathy, therefore diagnostic test such as CT, CT Myelography and MRI is suggested prior to surgical decompression.   | NASS      | II<br>I<br>II<br>(B)                                | Henderson et al, 1983<br>Slipman et al, 1998<br>Yoss et al, 1957  |
| Low volume – Non-current  |           |   |   |
| There is some evidence that MRI is useful in confirming compressive lesions such as disc herniation and spondylosis in patients with cervical radiculopathy unresponsive to conservative treatment and are possible candidates for interventional or surgical management.   | NASS      | II<br>III<br>III<br>III<br>III<br>(B)               | Bartlett et al, 1998<br>Hedberg et al, 1988<br>Modic et al, 1986<br>Van de Kelft & Van Vyve, 1994<br>Wilson et al, 1991   |
| Moderate volume – Non-current   |           |   |   |
| There is insufficient evidence on the usefulness of CT Scan in confirming compressive lesions such as disc herniation and spondylosis in patients with cervical radiculopathy unresponsive to conservative treatment and are possible candidates for interventional or surgical management, and in whom MRI is contraindicated. | NASS      | Consensus<br>(V)                                    | Illko et al, 1996   |
| Low volume – Non-current  |           |   |   |
| There is some evidence that CT Myelography may be done for patients with cervical radiculopathy in whom the clinical presentation is in conflict with MRI findings, and in whom MRI is contraindicated.   | NASS      | II<br>III<br>III<br>III<br>III<br>III<br>III<br>(B) | Bartlett et al, 1998<br>Houser et al, 1995<br>Houser et al, 1993<br>Modic et al, 1986<br>Russell et al, 1984<br>Van de Kelft & Van Vyve, 1994<br>Wilson et al, 1991 |
| Moderate volume – Non-current   |           |   |   |

- PARM recommends diagnostic test such as CT, CT Myelography and MRI is suggested prior to surgical decompression for patients with cervical radiculopathy.

- PARM recommends MRI in confirming compressive lesions such as disc herniation and spondylosis in patients with cervical radiculopathy unresponsive to conservative treatment and are possible candidates for interventional or surgical management.
- PARM recommends doing CT Scan in confirming compressive lesions such as disc herniation and spondylosis in patients with cervical radiculopathy unresponsive to conservative treatment and are possible candidates for interventional or surgical management, and in whom MRI is contraindicated.
- PARM suggests CT Myelography for diagnosis of patients with cervical radiculopathy in whom the clinical presentation is in conflict with MRI findings, and in whom MRI is contraindicated.

### 5.3.2. Electromyography (EMG)

**Table 28. Electromyography for patients with cervical radiculopathy**

| Recommendation   | Guideline | Level of Evidence | Reference                                |
|--|-----------|-------------------|--|
| There is insufficient evidence for or against the use of EMG for patients in whom the diagnosis of cervical radiculopathy is unclear after physical examination and MRI. | NASS      | III<br>III<br>(I) | Alrawi et al, 2007<br>Ashkan et al, 2002 |
| Low volume – Non-current   |           |                   |  |

- PARM suggests EMG as a diagnostic examination for patients with cervical radiculopathy.

### 5.3.3. Selective Nerve Block

**Table 29. Selective nerve block in cervical radiculopathy**

| Recommendation  | Guideline | Level of Evidence | Reference  |
|---|-----------|-------------------|--|
| There is insufficient evidence that selective nerve root block with appropriate dosing and technique may be considered in patients with cervical radiculopathy and compressive lesions identified at multiple levels on MRI or CT Myelography, and for patients in whom the clinical presentation is in conflict with MRI or CT Myelography findings. | NASS      | III<br>III<br>(C) | Anderberg et al, 2006a<br>Anderberg et al, 2006b |
| Low volume – Non-current  |           |                   |  |

- PARM suggests that nerve root block with appropriate dosing and technique may be considered in patients with cervical radiculopathy and compressive lesions identified at multiple levels on MRI or CT Myelography, and for patients in whom the clinical presentation is in conflict with MRI or CT Myelography findings.

## 5.4. OUTCOME MEASURES FOR CERVICAL RADICULOPATHY

**Table 30.** Outcome measures for cervical radiculopathy

| Recommendation   | Guideline | Level of Evidence         | Reference                    |
|--|-----------|---------------------------|------------------------------|
| There is evidence that clinicians may use validated self-report questionnaires such as the Neck Disability Index (NDI) to record baseline symptom status in patients with cervical radiculopathy, and monitor changes in pain, function and disability throughout the course of treatment.     | APTA      | I (A)                     | Cleland et al, 2006          |
|  | NASS      | I                         | Fernandez-Fairen et al, 2008 |
|  |           | II                        | Foley et al, 2008            |
|  |           | II                        | Kumar & Gowda, 2008          |
|  |           | I                         | Mummaneni et al, 2007        |
|  |           | I                         | Murrey et al, 2009           |
|  |           | III                       | Nunley et al, 2009           |
|  |           | I                         | Park et al, 2008             |
|  | (A)       | Peolsson & Peolsson, 2008 |                              |
| Inconsistent level of evidence - High volume – Current – Uniform thought   |           |                           |                              |
| There is evidence for the use of validated self-report questionnaires such as the Patient-Specific Functional Scale (PSFS) to record baseline symptom status in patients with cervical radiculopathy, and monitor changes in pain, function and disability throughout the course of treatment. | APTA      | I (A)                     | Cleland et al, 2006          |
|  | NASS      | I (B)                     | Cleland et al, 2006          |
| Consistent level of evidence -Low volume – Non-current – Uniform thought   |           |                           |                              |

- PARM endorses the use of validated self-report questionnaires such as the Neck Disability Index (NDI) and Patient-Specific Functional Scale (PSFS) to record baseline symptom status in patients with cervical radiculopathy, and monitor changes in pain, function and disability throughout the course of treatment.

## 5.5. MANAGEMENT OF CERVICAL RADICULOPATHY

### 5.5.1. Cervical Manipulation, Cervical traction, Neural Mobilization and Combination Therapy

**Table 31. Cervical manipulation, cervical traction, neural mobilization and combination therapy in cervical radiculopathy**

| Recommendation   | Guideline | Level of Evidence         | Reference  |
|--|-----------|---------------------------|--|
| There is insufficient evidence for the role of cervical manipulation in the management of cervical radiculopathy   | APTA      | IV (C)                    | Browder et al, 2004<br>Cleland et al, 2005<br>Moeti & Marchetti, 2001<br>Waldrop, 2006 |
| Moderate volume – Non-current  |           |                           |  |
| There is insufficient evidence that because cervical manipulation may possibly lead to worsening of symptoms or onset of complications, caution must be made with its use, and pre-manipulation imaging may be useful. | NASS      | V (Consensus)             | NASS, 2008   |
| Low volume – Current   |           |                           |  |
| There is insufficient evidence for doing neural mobilization in patients with cervical radiculopathy   | APTA      | III (B)                   | Murphy et al, 2006   |
| Low volume – Non-current   |           |                           |  |
| There is some evidence for the use of continuous or intermittent cervical traction in patients with cervical radiculopathy   | APTA      | III<br>IV<br>IV<br>IV (B) | Saal et al, 1996<br>Cleland et al, 2005<br>Waldrop 2006<br>Moeti & Marchetti, 2001     |
|  | NASS      | V (Consensus)             | Olivero & Dulebohn, 2002   |
| Consistent level of evidence - Moderate volume – Non-current – Uniform thought   |           |                           |  |
| There is insufficient evidence for combination therapy (medications, physical therapy, injections and traction) in patients with cervical radiculopathy  | NASS      | IV (Consensus)            | Saal et al, 1996   |
| Low volume, Non-current  |           |                           |  |

- PARM recommends continuous or intermittent cervical traction in managing patients with cervical radiculopathy.
- PARM suggests cervical manipulation for patients with cervical radiculopathy, however since it may possibly lead to worsening of symptoms or onset of complications, caution must be made with its use, and pre-manipulation imaging may be useful.
- PARM suggests neural mobilization and combination therapy (medications, physical therapy, injections and traction) in the treatment of patients with cervical radiculopathy.

### 5.5.2. Addressing Psychosocial Factors

**Table 32.** Addressing psychosocial factors in cervical radiculopathy

| <b>Recommendation</b>   | <b>Guideline</b> | <b>Level of Evidence</b> | <b>Reference</b>      |
|---|------------------|--------------------------|-----------------------|
| There is some evidence that psychosocial factors should be considered when addressing conservative, interventional and surgical treatment for patients with radiculopathy | NASS             | II<br>(Insufficient)     | Persson & Lilja, 2001 |
| Low volume – Non-current  |                  |                          |                       |

- PARM recommends that psychosocial factors should be considered when addressing conservative, interventional and surgical treatment for patients with radiculopathy.

### 5.5.3. Interventional /Invasive Procedures

**Table 33.** Interventional/invasive procedures for cervical radiculopathy

| <b>Recommendation</b>   | <b>Guideline</b> | <b>Level of Evidence</b>          | <b>Reference</b>  |
|---|------------------|-----------------------------------|---|
| There is some evidence for doing fluoroscopically-guided or CT-guided transforaminal epidural steroid injection | NASS             | IV<br>IV<br>IV<br>IV<br>II<br>(C) | Cyteval et al, 2004<br>Kim et al, 2007<br>Kolstad et al, 2005<br>Lin et al, 2006<br>Anderberg et al, 2007 |
| Moderate volume – Non-current   |                  |                                   |   |

- PARM recommends fluoroscopically-guided or CT-guided transforaminal epidural steroid injection for patients with cervical radiculopathy.

### 5.5.4. Surgical Management

**Table 34.** Surgical management of cervical radiculopathy

| Recommendation  | Guideline | Level of Evidence                           | Reference  |
|---|-----------|---|--|
| There is some evidence for the role of surgical management over medical/interventional treatment for rapid (early) relief of symptoms from cervical radiculopathy due to degenerative disorders, with similar outcomes however at one year. | NASS      | II<br>III<br>(B)                            | Persson et al, 1997<br>Sampath et al, 1999   |
| Low volume – Non-current  |           |   |  |
| There is some evidence that Anterior Cervical Discectomy (ACD) and Anterior Cervical Fusion (ACF) result in better outcomes than ACD alone in the management of single-level cervical radiculopathy due to degenerative disorders           | NASS      | III<br>II<br>III<br>III<br>III<br>II<br>(B) | Barlocher et al, 2002<br>Hauerberg et al, 2008<br>Oktenoglu et al, 2007<br>Savolainen et al, 1998<br>Wirth et al, 2000<br>Xie & Hurlbert, 2007 |
| Moderate volume – Non-current   |           |   |  |
| There is some evidence in the addition of an interbody graft for fusion to improve sagittal alignment following ACD   | NASS      | III<br>II<br>(B)                            | Barlocher et al, 2002<br>Xie & Hurlbert, 2007  |
| Low volume – Non-current  |           |   |  |
| There is insufficient evidence for plate stabilization for patients undergoing multi-level ACDF   | NASS      | V<br>(Consensus)                            | NASS, 2011   |
| Low volume – Current  |           |   |  |
| There is some evidence that Anterior Cervical Discectomy and Fusion (ACDF) and Posterior Laminoforaminotomy (PLF) result in similar outcomes in the management of single-level cervical radiculopathy due to degenerative disorders         | NASS      | III<br>III<br>III<br>(B)                    | Herwowitz et al, 1990<br>Korinth et al, 2006<br>Wirth et al, 2000  |
| Low volume – Non-current  |           |   |  |
| There is insufficient evidence for superiority of ACDF over PLF for the treatment of single-level cervical radiculopathy from central and paracentral nerve root compression and spondylotic disease  | NASS      | V<br>(Consensus)                            | NASS, 2011   |
| Low volume – Current  |           |   |  |
| There is some evidence that ACDF and Total Disc Arthroplasty (TDA) result in similar outcomes in the management of single-level cervical radiculopathy due to degenerative disorders  | NASS      | I<br>II<br>(B)                              | Murrey et al, 2009<br>Nabhan et al, 2007   |
| Low volume – Non-current  |           |   |  |
| There is some evidence for surgery as a   | NASS      | IV  | Hamburger et al, 2001  |

|   |  |                        |  |
|---|--|------------------------|--|
| treatment option in producing and maintaining favorable outcomes (>4 years) for patients with single-level cervical radiculopathy due to degenerative disorders |  | IV<br>IV<br>III<br>(C) | Heidecke et al, 2000<br>Jagannathan et al, 2009<br>Wirth et al, 2000 |
| Moderate volume – Non-current   |  |                        |  |

- PARM recommends surgical management over medical/interventional treatment for rapid (early) relief of symptoms from cervical radiculopathy due to degenerative disorders, with similar outcomes however at one year.
- PARM recommends Anterior Cervical Discectomy (ACD) and Anterior Cervical Fusion (ACF) over ACD alone in the management of single-level cervical radiculopathy due to degenerative disorders.
- PARM recommends the addition of an interbody graft for fusion to improve sagittal alignment following ACD.
- PARM recommends Anterior Cervical Discectomy-Fusion (ACDF), Posterior Laminoforaminotomy (PLF), or Total Disc Arthroplasty (TDA) as surgical management of single-level cervical radiculopathy due to degenerative disorders.
- PARM recommends surgery as a treatment option in producing and maintaining favorable outcomes (>4 years) for patients with single-level cervical radiculopathy due to degenerative disorders.
- PARM recommends Anterior Cervical Discectomy-Fusion (ACDF) and Posterior Laminoforaminotomy (PLF) for the treatment of single-level cervical radiculopathy from central and paracentral nerve root compression and spondylotic disease.
- PARM suggests plate stabilization for patients undergoing multi-level ACDF.
- PARM suggests ACDF over PLF for the treatment of single-level cervical radiculopathy from central and paracentral nerve root compression and spondylotic disease.

## 5.6 PARM CONTEXT POINTS FOR CERVICAL RADICULOPATHY

**Table 35.** Context points for minimum and additional standard care of practice for management of cervical radiculopathy.

|                 | <b>Minimum standard care of practice</b>  | <b>Additional standard care of practice</b>   |
|-----------------|---|---|
| Practice method | <ul style="list-style-type: none"> <li>• History-taking:<br/>-include elicitation of typical and atypical signs of cervical radiculopathy)</li> <li>• Physical examination:<br/>-include neurological assessment<br/>-special tests: Spurling’s test, Upper limb tension test</li> <li>• Functional monitoring:<br/>-NDI<br/>-PSFS</li> <li>• Intermittent or continuous mechanical cervical traction:</li> <li>• Combination therapy:<br/><br/>-medications<br/><br/>-physical therapy<br/><br/>-injections<br/><br/>-traction</li> <li>• Addressing psychosocial factors</li> </ul> | <ul style="list-style-type: none"> <li>• Diagnostics:<br/>-CT<br/>-MRI<br/>-EMG<br/>-Selective nerve block</li> <li>• Non-invasive management:<br/>-cervical manipulation,<sup>+</sup><br/>-neural mobilization<sup>+</sup></li> <li>• Invasive management:<br/>-CT-guided transforaminal epidural steroid injection</li> <li>• Possible surgical interventions:<br/>-ACD<br/>-ACF<br/>-ACDF<br/>-PLF<br/>-TDA</li> </ul> |
| Resources       | <ul style="list-style-type: none"> <li>• Physiatrist</li> <li>• Physical therapist</li> </ul>   | <ul style="list-style-type: none"> <li>• Physiatrist</li> <li>• Physical therapist trained in cervical manipulation, neural mobilization</li> <li>• Orthopedic surgeon</li> <li>• Neurosurgeon</li> </ul>   |
| Resources       | <ul style="list-style-type: none"> <li>• Physical therapy room</li> </ul>   | <ul style="list-style-type: none"> <li>• Physical therapy room</li> <li>• Operating room</li> </ul>   |

|   |                     |                     |
|---|---------------------|---------------------|
| Training  | • Within competency | • Within competency |
| When is it done   | • Upon consultation | • Upon consultation |
| Reassessment<br>using at least one<br>standard outcome<br>measure | • Four to six weeks | • Four to six weeks |

---

<sup>+</sup>Spinal manipulation and neural mobilization should be given only by a professional who is registered to practice in the Philippines (i.e. physician, PT), with recognized and credible training, approved by any of the following: Professional Regulation Commission (PRC), Department of Health (DOH), or their respective professional organization/s; and can provide documented evidence of safe and evidence-based practice.

# 6 Whiplash-Associated Disease

Whiplash is a sudden acceleration-deceleration and hyperflexion-hyperextension injury of the cervical spine usually caused by rear-end collision of motor vehicles. Other sources of whiplash injury include, train crashes (the most common cause prior to the invention of automobile), roller coaster rides, extreme recreational activities like bungee-jumping and contact sports. It commonly affects the zygapophyseal (facet) joints, cervical muscles such as the trapezius, levator scapula, paraspinals, and sternocleidomastoid. Severe injury to the cervical spine may involve the cervical discs, vertebral fractures, brachial plexus, cervical nerve roots, sympathetic nerve trunk, and spinal cord. Some of the signs and symptoms include fatigue, dizziness, nausea, headache, paresthesia, neck and back pain, jaw pain, and visual disturbance. Development of chronic whiplash associated disorder (WAD) occurs in 12-40% of those who sustain a whiplash injury (Eck et al., 2001). Patients with chronic WAD will likely have sensory and motor hypersensitivity to various stimuli, increased flexor withdrawal response and vasomotor disturbance.

## 6.1. HISTORY-TAKING FOR WHIPLASH-ASSOCIATED DISEASE

**Table 36.** History-taking for whiplash-associated disease

| Recommendation   | Guideline | Level of Evidence      | Reference                           |
|--|-----------|------------------------|-------------------------------------|
| There is insufficient evidence regarding the value of history-taking for positive diagnosis of whiplash-associated diseases, but current limited literature advises following details be obtained: date of birth, gender and the circumstances of injury and relevant crash factors; time since injury; self-reported injury severity; and prior history of neck or other pain symptoms, including previous whiplash injury. | TRACsa    | Consensus<br>Consensus | TRACsa, 2008<br>Spitzer et al, 1995 |
| Low volume – Current   |           |                        |                                     |

- PARM suggests history-taking for diagnosing whiplash-associated diseases, which includes the following details: date of birth, gender and the circumstances of injury and relevant crash factors; time since injury; self-reported injury severity; and prior history of neck or other pain symptoms, including previous whiplash injury.

## 6.2. ASSESSMENT OF WHIPLASH-ASSOCIATED DISEASE

### 6.2.1. Physical Examination for Whiplash-associated Disease

**Table 37.** Physical examination for whiplash-associated disease

| Recommendation  | Guideline | Level of Evidence      | Reference                           |
|---|-----------|------------------------|-------------------------------------|
| There is insufficient evidence regarding the value of a focused physical examination for positive diagnosis whiplash-associated diseases, but current limited literature advises that the following signs be assessed: head position and posture; palpation for tender points in the neck; assessment of range of motion; sensorimotor and reflex testing; evaluation of associated injuries and co morbidities; and assessment of general medical condition including psychological state. | TRACsa    | Consensus<br>Consensus | TRACsa, 2008<br>Spitzer et al, 1995 |
| Low volume – Current  |           |                        |                                     |

- PARM suggests doing a focused physical examination in patients with whiplash-associated diseases, including the following assessment parameters: head position and posture; palpation for tender points in the neck; assessment of range of motion; sensorimotor and reflex testing; evaluation of associated injuries and co morbidities; and assessment of general medical condition including psychological state.

### 6.2.2. Grading Whiplash-Associated Disease

**Table 38.** Grading whiplash-associated disease

| Recommendation  | Guideline | Level of Evidence      | Reference                           |
|---|-----------|------------------------|-------------------------------------|
| There is insufficient evidence regarding grading whiplash-associated diseases, but current limited literature advises that after evaluation of WAD, patients should be categorized as a level I, II, III, or IV according to the whiplash-associated disease. | TRACsa    | Consensus<br>Consensus | TRACsa, 2008<br>Spitzer et al, 1995 |
| Low volume – Current  |           |                        |                                     |

- PARM suggests categorizing patients with whiplash-associated disease according to the QTF Classification (Level I to IV).

### 6.3. OUTCOME MEASURES FOR WHIPLASH-ASSOCIATED DISEASE

**Table 39. Outcome measures for whiplash-associated disease**

| Recommendation   | Guideline | Level of Evidence | Reference  |
|--|-----------|-------------------|--|
| There is evidence that the routine use of a measure of pain intensity, such as the visual analogue pain scale (VAS), and a measure of disability, such as the Neck Disability Index (NDI) is useful for all WAD patients.  | TRACsa    | A                 | Hendriks et al, 2005<br>Berglund et al, 2006<br>Radanov et al, 1995<br>Olsson et al, 2002<br>Buitenhuis et al, 2006<br>Borchgrevink et al, 1995<br>Drottning et al, 1995<br>Richter et al, 2004<br>Soderlund & Lindberg, 2003<br>Crouch et al, 2006<br>Nederhand et al, 2004<br>Kasch et al, 2005<br>Nederhand et al, 2003<br>Sterling et al, 2005 |
| High volume – Non-current  |           |                   |  |
| There is insufficient evidence regarding measuring aspects of patient distress, however current limited literature advises the use of the Self Efficacy Scale (SES) and the Coping Strategies Questionnaire – Catastrophizing subscale (CSQ-CAT) to assess the psychological status of persons with WAD, which may be done at three to six week review, where appropriate. | TRACsa    | Consensus         | TRACsa, 2008   |
| Low volume – Current   |           |                   |  |

- PARM endorses the use of measures of pain intensity, such as the visual analogue pain scale (VAS), and measures of disability, such as the Neck Disability Index (NDI) in monitoring WAD patients.
- PARM suggests using Self Efficacy Scale (SES) and the Coping Strategies Questionnaire – Catastrophizing subscale (CSQ-CAT) to assess the psychological status of persons with WAD, which may be done at three to six week review, where appropriate

## 6.4. PROGNOSIS FOR WHIPLASH-ASSOCIATED DISEASE

**Table 40.** Prognosis for whiplash-associated diseases

| Recommendation  | Guideline | Level of Evidence          | Reference  |
|---|-----------|----------------------------|--|
| There is evidence that WAD patients with potentially poor prognosis (high VAS scores = pain $\geq$ 7/10, and high NDI scores = disability score > 40/100) should be noted, prompting the need for more regular review of treatment or earlier referral to a specialist.   | TRACsa    | A                          | Hendriks et al, 2005<br>Berglund et al, 2006<br>Radanov et al, 1995<br>Olsson et al, 2002<br>Buitenhuis et al, 2006<br>Borchgrevink et al, 1995<br>Drottning et al, 1995<br>Richter et al, 2004<br>Soderlund & Lindberg, 2003<br>Crouch et al, 2006<br>Nederhand et al, 2004<br>Kasch et al, 2005<br>Nederhand et al, 2003<br>Sterling et al, 2005 |
| High volume – Non-current   |           |                            |  |
| There is strong evidence that clinicians should identify psychological factors which may present after whiplash injury (manifesting as affecting disturbances, anxiety, depression, fear of movement, and post-traumatic stress disorder), and utilize appropriately-matched education and counseling strategies. | APTA      | II                         | Jull et al, 2007<br>Sterling et al, 2006<br>Sterling et al, 2003<br>Nederhand et al, 2004<br>Peebles et al, 2001<br>Wenzel et al, 2002 -<br>Kuch et al, 1994<br>Drottning et al, 1995<br>Vernon and Mior, 1991   |
|   | TRACsa    | A<br>A<br>A<br>B<br>B<br>B | Soderlund & Lindberg, 2003<br>Kyhlback et al, 2002<br>Nederhand et al, 2004<br>Hendriks et al, 2005<br>Radanov et al, 1995<br>Richter et al, 2004  |
| Consistent level of evidence – Moderate volume – Non-current – Uniform thought  |           |                            |  |
| There is some evidence that decreased cervical mobility (neck range of motion) is associated with ongoing disability after whiplash injury  | TRACsa    | B                          | Kasch et al, 2001<br>Sterling et al, 2003  |
| Low volume – Non-current  |           |                            |  |
| There is some evidence that radiological findings should not be used to determine prognosis after whiplash  | TRACsa    | A-B                        | Radanov et al, 1995<br>Hildingsson & Toolanen, 1990<br>Ryan et al, 1994  |
| High volume – Non-current   |           |                            |  |

**Table 40 (Continued).** Prognosis for whiplash-associated diseases

|   |        |   |  |
|---|--------|---|--|
| There is evidence that crash-related factors (velocity or direction of impact, the presence of a head rest, the seating position in the vehicle, the person's awareness of the collision, and whether the vehicle was drivable) are not accurate prognosticating factors, and should not be used to determine predictive outcome (for physical symptoms) after whiplash injury. | TRACsa | A | Berglund et al, 2006<br>Olsson et al, 2002<br>Borchgrevink et al, 1995<br>Crouch et al, 2006<br>Hildingsson & Toolanen, 1990<br>Ryan et al, 1994<br>Kivioja et al, 2005<br>Borchgrevink et al, 1997<br>Gun et al, 2005<br>Minton et al, 2000<br>Radanov & Sturzenegger, 1996a<br>Radanov et al, 1994<br>Radanov et al, 1993<br>Radanov & Sturzenegger, 1996b |
| High volume – Non-current   |        |   |  |
| There is evidence that avoidance and depression are not associated with poor outcome after whiplash injury.   | TRACsa | B | Hendriks et al, 2005<br>Drottning et al, 1995<br>Richter et al, 2004<br>Gargan & Bannister, 1994<br>Borchgrevink et al, 1997<br>Radanov et al, 1991<br>Gargan et al, 1997  |
| Moderate volume – Non-current   |        |   |  |
| There is some evidence that poor mental health is not associated with poor outcome after whiplash injury.   | TRACsa | A | Richter et al, 2004<br>Gun et al, 2005   |
| Low volume – Non-current  |        |   |  |
| There is some evidence that older age is not associated with ongoing pain or disability after whiplash injury.  | TRACsa | B | Berglund et al, 2006<br>Gun et al, 2005  |
| Low volume – Non-current  |        |   |  |
| There is evidence that the following factors are not associated with poor prognosis after whiplash injury: work dissatisfaction, diverting attention, increased behavioral activity, poor physical health, and poor social functioning.   | TRACsa | A | Radanov et al, 1995<br>Richter et al, 2004<br>Soderlund & Lindberg, 2003<br>Sterling et al, 2005<br>Atherton et al, 2006<br>Borchgrevink et al, 1997<br>Kivioja et al, 2004<br>Gun et al, 2005<br>Gargan & Bannister, 1994   |
| High volume – Non-current   |        |   |  |

- PARM strongly endorses that clinicians should identify psychological factors which may present after whiplash injury (manifesting as affecting disturbances, anxiety, depression, fear of movement, and post-traumatic stress disorder), and utilize appropriately-matched education and counseling strategies.
- PARM endorses that WAD patients with potentially poor prognosis (high VAS scores = pain  $\geq$  7/10, and high NDI scores = disability score  $>$  40/100) should be noted, prompting the need for more regular review of treatment or earlier referral to a specialist.
- PARM recommends that that decreased cervical mobility (neck range of motion) is associated with ongoing disability after whiplash injury.
- PARM does not recommend using radiological findings in determining prognosis after whiplash.
- PARM does not recommend that poor mental health and older age are not associated with poor outcome after acute whiplash injury.
- PARM does not endorse that the presence of avoidance and depression are associated with poor outcome after whiplash injury.
- PARM does not endorse the following factors as accurate prognosticating elements after whiplash injury: work dissatisfaction, diverting attention, increased behavioral activity, poor physical health, and poor social functioning.

## 6.5. MANAGEMENT OF WHIPLASH-ASSOCIATED DISEASE

### 6.5.1. Acute Whiplash-associated Disease (Acute Whiplash Injury)

#### 6.5.1.1. Physical activity and Exercises

**Table 41.** Physical activity and exercises for acute whiplash injury

| Recommendation  | Guideline | Level of Evidence | Reference   |
|---|-----------|-------------------|---|
| There is strong evidence for the usefulness of active exercises (such as range of motion, mobilizing exercises, and strengthening of the neck and scapular muscles) in the treatment of acute whiplash injury | APTA      | I                 | Crawford et al, 2004<br>Senstad et al, 1997<br>Vassiliou et al, 2006  |
|   | TRACsa    | A                 | Rosenfeld et al, 2006<br>Vassiliou et al, 2006<br>Bonk et al, 2008<br>Mealy et al, 1986<br>Crawford et al, 2004<br>McKinney, 1989 |
| Consistent level of evidence – Moderate volume – Non-current – Uniform thought  |           |                   |   |
| There is some evidence for clinicians to educate or reassure patients with acute whiplash injury, and to advise them continue their usual activities.   | TRACsa    | B                 | Brochgreink et al, 1998   |
| Low volume – Non-current  |           |                   |   |

- PARM strongly endorses active exercises (such as range of motion, mobilizing exercises, and strengthening of the neck and scapular muscles) in the treatment of acute whiplash injury.

- PARM recommends educating or reassuring patients with acute whiplash injury, and advising them to continue their usual activities.

### 6.5.1.2. Cervical Manipulation, Cervical Collar, Physical Modalities

**Table 42.** Cervical manipulation, cervical collar, physical modalities in acute whiplash injury

| Recommendation   | Guideline | Level of Evidence | Reference  |
|--|-----------|-------------------|--|
| There is insufficient evidence for the role of passive joint mobilization or cervical manipulation for patients with acute whiplash injury   | TRACsa    | C                 | Fernandez delas Penas et al, 2004a<br>Fernandez delas Penas, 2004b   |
| Low volume – Non-current   |           |                   |  |
| There is evidence against prescribing cervical collars and advising rest in patients with acute whiplash injury.   | TRACsa    | A                 | Rosenfeld et al, 2006<br>Vassiliou et al, 2006<br>Bonk et al, 2008<br>Mealy et al, 1986<br>Crawford et al, 2004<br>McKinney, 1989<br>Brochgrevink et al, 1998                            |
| Moderate volume – Non-current  |           |                   |  |
| There is insufficient evidence against the use of cervical pillows in the management of patients with acute whiplash injury grades I-III.  | TRACsa    | Consensus         | TRACsa, 2008   |
| Low volume – Current   |           |                   |  |
| There is insufficient evidence for applying heat, ice and massage for patients with acute whiplash injury, but these may be given out as long as there is ongoing measurable improvement with their use.   | TRACsa    | Consensus         | TRACsa, 2008   |
| Low volume – Current   |           |                   |  |
| There is insufficient evidence for applying electrotherapies (including TENS, pulsed magnetic therapy, electrical stimulation, ultrasound and shortwave diathermy) for patients with acute whiplash injury, but these may be given out as long as there is ongoing measurable improvement with their use.  | TRACsa    | C                 | Foley-Nolan et al, 1992<br>Hendriks & Horgan, 1996<br>Thuile & Walzl, 2002   |
| Low volume – Non-current   |           |                   |  |
| There is evidence for the benefits of multimodal therapy (range of individual treatment modalities such as joint mobilization, relaxation techniques, electrotherapies and exercises as part of a package to address individual patient deficits) in the treatment of patients with acute whiplash injury. | TRACsa    | B                 | Rosenfeld et al, 2006<br>Vassiliou et al, 2006<br>Bonk et al, 2008<br>Mealy et al, 1986<br>Crawford et al, 2004<br>McKinney, 1989<br>Brochgrevink et al, 1998<br>Provinciali et al, 1996 |
| High volume – Non-current  |           |                   |  |

- PARM endorses multimodal therapy (range of individual treatment modalities such as joint mobilization, relaxation techniques, electrotherapies and exercises as part of a package to address individual patient deficits) in the treatment of patients with acute whiplash injury.
- PARM suggests passive joint mobilization or cervical manipulation for patients with acute whiplash injury.
- PARM suggests thermal agents (heat & ice), massage, and electrotherapies (including TENS, pulsed magnetic therapy, electrical stimulation, ultrasound and shortwave diathermy), for patients with acute whiplash injury as long as there is ongoing measurable improvement with their use.
- PARM does not suggest cervical pillows in the management of patients with acute whiplash injury grades I-III.
- PARM does not endorse the use of cervical collars and advising rest in patients with acute whiplash injury, however if prescribed, it should not be used for more than 48 hours.

### 6.5.1.3. Pharmacological agents

**Table 43.** Pharmacological agents for acute whiplash injury

| <b>Recommendation</b>  | <b>Guideline</b> | <b>Level of Evidence</b> | <b>Reference</b> |
|--|------------------|--------------------------|------------------|
| There is some evidence for the benefit of giving simple analgesics and NSAIDs for patients with acute whiplash injury.                       | TRACsa           | B                        | Gunzberg, 1999   |
| Low volume – Non-current   |                  |                          |                  |
| There is insufficient evidence against the use of high-dose methylprednisolone infusion in patients with acute whiplash injury grades I-III. | TRACsa           | Consensus                | TRACsa, 2008     |
| Low volume – Current   |                  |                          |                  |

- PARM recommends giving simple analgesics and NSAIDs for patients with acute whiplash injury.
- PARM does not suggest the use of high-dose methylprednisolone infusion in patients with acute whiplash injury grades I-III

#### 6.5.1.4. Interventional Procedures

**Table 44.** Interventional procedures for acute whiplash injury

| <b>Recommendation</b>  | <b>Guideline</b> | <b>Level of Evidence</b> | <b>Reference</b> |
|--|------------------|--------------------------|------------------|
| There is insufficient evidence against the use of intra-articular and intrathecal injections for patients with acute whiplash injury grades I-III. | TRACsa           | Consensus                | TRACsa, 2008     |
| Low volume – Current   |                  |                          |                  |

- PARM does not suggest the use of intra-articular and intrathecal injections for patients with acute whiplash injury grades I-III.

#### 6.5.1.5. Surgical Management

**Table 45.** Surgical management for acute whiplash injury

| <b>Recommendation</b>  | <b>Guideline</b> | <b>Level of Evidence</b> | <b>Reference</b> |
|--|------------------|--------------------------|------------------|
| There is insufficient evidence against the role of surgery in acute whiplash injury grades I-III, but can be considered for grade IV, or grade III with persistent arm pain unresponsive to conservative management. | TRACsa           | Consensus                | TRACsa, 2008     |
| Low volume – Current   |                  |                          |                  |

- PARM does not suggest surgery in acute whiplash injury grades I-III, but can be considered for grade IV, or grade III with persistent arm pain unresponsive to conservative management.

### 6.5.2. Chronic Whiplash-associated Disorder (Chronic Whiplash Disease)

#### 6.5.2.1. Physical activity and Exercises

**Table 46.** Physical activity and exercises for chronic whiplash disease

| <b>Recommendation</b>  | <b>Guideline</b> | <b>Level of Evidence</b> | <b>Reference</b>   |
|--|------------------|--------------------------|--|
| There is strong evidence for the usefulness of active exercises (such as range of motion, mobilizing exercises, and strengthening of the neck and scapular muscles) in the treatment of chronic whiplash disease | APTA             | I                        | Rosenfeld et al, 2003  |
|  | TRACsa           | B                        | Jull et al, 2007<br>Stewart et al, 2007<br>Fitz-Ritson, 1995 |
| Consistent level of evidence – Moderate volume – Non-current – Uniform thought   |                  |                          |  |

|  |        |   |   |
|--|--------|---|---|
| There is some evidence for clinicians to educate or reassure patients with chronic whiplash disease, and to advise them continue their usual activities. | TRACsa | B | Jull et al, 2007<br>Stewart et al, 2007 |
| Low volume – Non-current   |        |   |   |

- PARM strongly endorses active exercises (such as range of motion, mobilizing exercises, and strengthening of the neck and scapular muscles) in the treatment of chronic whiplash disease.
- PARM recommends educating or reassuring patients with chronic whiplash disease, and advising them to continue their usual activities.

### 6.5.2.2. Cognitive Behavioral Approach, Cervical Manipulation, Cervical Collar, Physical Modalities

**Table 47.** Cognitive Behavioral Approach, Cervical Manipulation, Cervical Collar, Physical Modalities for chronic whiplash disease

| Recommendation   | Guideline | Level of Evidence | Reference  |
|--|-----------|-------------------|--|
| There is insufficient evidence for the integration of cognitive behavioral approach in managing patients with chronic whiplash disease, but this may be given out as long as there is ongoing measurable improvement with its use. | APTA      | IV                | Soderlund & Linberg, 2001                        |
|  | TRACsa    | C                 | Stewart et al, 2007<br>Soderlund & Linberg, 2001 |
| Consistent level of evidence – Low volume – Non-current – Uniform thought  |           |                   |  |
| There is insufficient evidence for the role of passive joint mobilization or cervical manipulation for patients with chronic whiplash disease  | TRACsa    | Consensus         | TRACsa, 2008                                     |
| Low volume – Current   |           |                   |  |
| There is insufficient evidence against the benefits of cervical collar immobilization and prescribed rest in patients with chronic whiplash disease.   | TRACsa    | Consensus         | TRACsa, 2008                                     |
| Low volume – Current   |           |                   |  |
| There is insufficient evidence against the usefulness of cervical pillows in the management of patients with chronic whiplash disease grades I-III.  | TRACsa    | Consensus         | TRACsa, 2008                                     |
| Low volume – Current   |           |                   |  |
| There is insufficient evidence against the use of electrotherapy in patient with chronic whiplash disease grades I-III   | TRACsa    | Consensus         | TRACsa, 2008                                     |
| Low volume – Current   |           |                   |  |
| There is insufficient evidence for the benefits of multimodal therapy (range of  | TRACsa    | Consensus         | TRACsa, 2008                                     |

|   |        |   |                    |
|---|--------|---|--------------------|
| individual treatment modalities such as joint mobilization, relaxation techniques, electrotherapies and exercises as part of a package to address individual patient deficits) in the treatment of patients with chronic whiplash disease, but this may be given out as long as there is ongoing measurable improvement with their use. |        |   |                    |
| Low volume – Current  |        |   |                    |
| There is insufficient evidence for vestibular rehabilitation in chronic whiplash injury associated with dizziness, but this may be given out as long as there is ongoing measurable improvement with its use.   | TRACsa | C | Ekvall et al, 2006 |
| Low volume – Non-current  |        |   |                    |

- PARM suggests passive joint mobilization/cervical manipulation, cognitive behavioral approach, multimodal therapy, vestibular rehabilitation in managing patients with chronic whiplash disease as long as there is ongoing measurable improvement with its use.
- PARM does not suggest cervical pillow immobilization, cervical collar and electrotherapy for patients with chronic whiplash disease grades I-III.

### 6.5.2.3. Pharmacological Agents

**Table 48.** Pharmacological agents for chronic whiplash disease

| Recommendation   | Guideline | Level of Evidence | Reference    |
|--|-----------|-------------------|--------------|
| There is insufficient evidence against giving analgesic injections for patients with chronic whiplash disease due to lack of long-term outcomes. | TRACsa    | Consensus         | TRACsa, 2008 |
| Low volume – Current   |           |                   |              |

- PARM does not suggest giving analgesic injections for patients with chronic whiplash disease due to lack of long-term outcomes.

### 6.5.2.4. Invasive/Interventional Procedures

**Table 49.** Invasive/Interventional Procedures for chronic whiplash disease

| Recommendation   | Guideline | Level of Evidence | Reference    |
|--|-----------|-------------------|--------------|
| There is insufficient evidence against the use of intra-articular and intrathecal injections in patients with chronic whiplash disease grades I-III. | TRACsa    | Consensus         | TRACsa, 2008 |
| Low volume – Current   |           |                   |              |

|  |        |           |                  |
|--|--------|-----------|------------------|
| There is insufficient evidence against the use of botulinum toxin injections in patients with chronic whiplash disease grades I-III.   | TRACsa | Consensus | TRACsa, 2008     |
| Low volume – Current   |        |           |                  |
| There is some evidence that radiofrequency neurotomy may be useful for patients with chronic whiplash disease whose symptoms are shown to arise from the lower cervical joints, whose facet joint pain has been confirmed by a local anesthetic block, and who are unresponsive to other conservative treatment. | TRACsa | B         | Lord et al, 1996 |
| Low volume – Non-current   |        |           |                  |
| There is insufficient evidence for the role of subcutaneous water injections in carefully selected patients with chronic whiplash disease as long as there is ongoing measurable improvement with its use.   | TRACsa | C         | Byrn et al, 1993 |
| Low volume – Non-current   |        |           |                  |

- PARM recommends radiofrequency neurotomy for patients with chronic whiplash disease whose symptoms are shown to arise from the lower cervical joints, whose facet joint pain has been confirmed by a local anesthetic block, and who are unresponsive to other conservative treatment.
- PARM suggests subcutaneous water injections in carefully-selected patients with chronic whiplash disease as long as there is ongoing measurable improvement with its use.
- PARM does not suggest intra-articular/ intrathecal injections, and botulinum toxin injections in patients with chronic whiplash disease grades I-III.

#### 6.5.2.5. Surgical Management

**Table 50.** Surgical management of chronic whiplash disease

| Recommendation   | Guideline | Level of Evidence | Reference    |
|--|-----------|-------------------|--------------|
| There is insufficient evidence against surgery in chronic whiplash disease grades I-III, but can be considered for grade IV or grade III with persistent arm pain unresponsive to conservative management. | TRACsa    | Consensus         | TRACsa, 2008 |
| Low volume – Current   |           |                   |              |

- PARM does not suggest surgery in chronic whiplash disease grades I-III, but can be considered for grade IV or grade III with persistent arm pain unresponsive to conservative management.

## 6.6 PARM CONTEXT POINTS FOR WHIPLASH-ASSOCIATED DISORDER

**Table 51.** Context points for minimum and additional standard care of practice for management of whiplash-associated disorder

|                 | Minimum standard care of practice  | Additional standard care of practice  |
|-----------------|--|---|
| Practice method | <ul style="list-style-type: none"> <li>• History-taking</li> <li>• Focused Physical examination</li> <li>• Grading whiplash-associated disorders: QTF Classification</li> <li>• Functional monitoring:               <ul style="list-style-type: none"> <li>-VAS</li> <li>-NDI</li> <li>-SES</li> <li>-QSQ-CAT</li> </ul> </li> <li>• Risk factor assessment and prognostication</li> <li>• Simple analgesics and NSAIDs<sup>a</sup></li> <li>• Therapeutic exercises (range of motion, mobilizing exercises, and strengthening of the neck and scapular muscle)<sup>a,b</sup></li> <li>• Reassurance and advice to continue usual activities<sup>a,b</sup></li> <li>• Multimodal therapy<sup>a,b</sup> <ul style="list-style-type: none"> <li>-joint mobilization</li> <li>-relaxation techniques</li> <li>-electrotherapies</li> <li>-exercises</li> </ul> </li> <li>• Thermal agents<sup>a,*</sup>:               <ul style="list-style-type: none"> <li>-heat</li> <li>-ice</li> </ul> </li> <li>• Massage<sup>a,*</sup></li> <li>• Electrotherapies: <sup>a,*</sup> <ul style="list-style-type: none"> <li>-TENS</li> <li>-pulsed magnetic therapy</li> <li>-electrical stimulation</li> <li>-ultrasound</li> <li>-shortwave diathermy</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Cervical mobilization<sup>+,a</sup></li> <li>• Passive joint mobilization<sup>+,a</sup></li> <li>• Cognitive behavioral approach<sup>b</sup></li> <li>• Vestibular rehabilitation<sup>b</sup></li> <li>• Radiofrequency neurotomy<sup>c,++</sup></li> <li>• Subcutaneous water injections in carefully-selected patients<sup>c,*</sup></li> <li>• Surgery can be considered for grade IV, or grade III with persistent arm pain unresponsive to conservative management<sup>a</sup></li> </ul> |
| Resources       | <ul style="list-style-type: none"> <li>• Physiatrist</li> <li>• Physical therapist</li> </ul>  | <ul style="list-style-type: none"> <li>• Physiatrist</li> <li>• Physical therapist trained in cervical manipulation/passive joint</li> </ul>  |

|  |   |  |   |
|--|---|--|---|
|  |   |  | <ul style="list-style-type: none"> <li>• mobilization</li> <li>• PT trained in vestibular rehabilitation</li> <li>• Psychologist</li> <li>• Specialist trained in radiofrequency neurotomy</li> <li>• Orthopedic surgeon</li> <li>• Neurosurgeon</li> <li>• Physical therapy room</li> <li>• Operating room</li> <li>•</li> </ul> |
| Resources  | <ul style="list-style-type: none"> <li>• Physical therapy room</li> </ul> |  |   |
| Training   | <ul style="list-style-type: none"> <li>• Within competency</li> </ul>     |  | <ul style="list-style-type: none"> <li>• Within competency</li> </ul>   |
| When is it done  | <ul style="list-style-type: none"> <li>• Upon consultation</li> </ul>     |  | <ul style="list-style-type: none"> <li>• Upon consultation</li> </ul>   |
| Reassessment using at least one standard outcome measure | <ul style="list-style-type: none"> <li>• Four to six weeks</li> </ul>     |  | <ul style="list-style-type: none"> <li>• Four to six weeks</li> </ul>   |

---

<sup>a</sup> for acute whiplash injury

<sup>b</sup> for chronic whiplash disease

\* as long as there is ongoing measurable improvement with its use

<sup>†</sup>Cervical mobilization and passive joint mobilization should be given only by a professional who is registered to practice in the Philippines (i.e. physician, PT), with recognized and credible training, approved by any of the following: Professional Regulation Commission (PRC), Department of Health (DOH), or their respective professional organization/s; and can provide documented evidence of safe and evidence-based practice.

# 7 Chronic neck pain with headache (Cervicocranial Syndrome)

The diagnosis of cervicocranial syndrome, or neck pain with headaches, is considered in patients who present with dull and constant throbbing at the neck or suboccipital area, which is worsened by movement or provocation of the head and neck. Based on the International Statistical Classification of Diseases and Related Health Problems (ICD) and World Health Organization’s International Classification of Functioning, Disability, and Health (ICF), clinical diagnosis is made with the following findings: unilateral headache associated with neck/suboccipital area symptoms that are aggravated by neck movements or positions; headache produced or aggravated with provocation of the ipsilateral posterior cervical myofascia and joints; restricted cervical range of motion; restricted cervical segmental mobility; and abnormal/substandard performance on the cranial cervical flexion test. Cervicocranial syndrome is also called Barré-Liéou syndrome or Posterior Cervical Sympathetic Syndrome, and may also present with tinnitus, ear pain, dizziness, and facial or sinus pain, all attributable to compression of cervical sympathetic nerves or even disordered circulation in the trigeminal and facial cranial nerves. Due to the chronic nature of this disease, afflicted patients tend to develop secondary symptoms such as restlessness, irritability, and inability to concentrate, therefore early recognition and management is advised.

## 7.1. CLASSIFYING CERVICOCRANIAL SYNDROME

**Table 52.** Classifying cervicocranial syndrome

| Recommendation   | Guideline | Level of Evidence | Reference   |
|--|-----------|-------------------|---|
| There is evidence that the diagnosis of cervicocranial syndrome (or neck pain with headaches) can be made with reasonable certainty when the patient presents with the following findings: unilateral headache associated with suboccipital area and aggravated by neck movements and positions, headache incited or worsened by provocation of the ipsilateral posterior cervical myofascial and joints, restricted cervical range of motion and segmental mobility, and abnormal or impaired performance of the cranial cervical flexion test. | APTA      | II (B)            | Antonaci et al, 2001<br>Fritz and Brennan, 2007<br>Jull et al, 2002<br>Zito et al, 2006 |
| Moderate – Non-current   |           |                   |   |

- PARM endorses the diagnosis of cervicocranial syndrome (or neck pain with headaches) in patients who present with the following findings: unilateral headache associated with suboccipital area and aggravated by neck movements and positions, headache incited or worsened by provocation of the ipsilateral posterior cervical myofascial and joints, restricted cervical range of motion and segmental mobility, and abnormal or impaired performance of the cranial cervical flexion test.

**7.2. MANAGEMENT FOR CERVICOCRANIAL SYNDROME:**

**7.2.1 Cervical manipulation, Specific Exercises**

**Table 53.** Cervical manipulation and specific exercises for cervicocranial syndrome

| <b>Recommendation</b>  | <b>Guideline</b> | <b>Level of Evidence</b> | <b>Reference</b>                         |
|--|------------------|--------------------------|--|
| There is some evidence for the use of cervical manipulation in the management of chronic neck pain with headache                                 | APTA             | II<br>I<br>(A)           | Vernon et al 2006<br>Nilsson et al, 1997 |
| Low volume – Non-current   |                  |                          |  |
| There is some evidence for prescribing specific exercises (neck stretching and strengthening) for patients with chronic neck pain with headache. | APTA             | I<br>I<br>(A)            | Kay et al, 2005<br>Jull et al, 2002      |
| Low volume – Non-current   |                  |                          |  |

- PARM endorses cervical manipulation and prescribing specific exercises (neck stretching and strengthening) for patients with chronic neck pain with headache.

### 7.3 PARM CONTEXT POINTS FOR CERVICOCRANIAL SYNDROME

**Table 54.** Context points for minimum and additional standard care of practice for management of cervicocranial syndrome.

|  | <b>Minimum standard care of practice</b>  | <b>Additional standard care of practice</b>  |
|--|---|--|
| Practice method  | <ul style="list-style-type: none"> <li>• History-taking</li> <li>• Physical examination</li> <li>• Therapeutic exercises: specific exercises (neck stretching and strengthening)</li> </ul> | <ul style="list-style-type: none"> <li>• Cervical manipulation<sup>+</sup></li> </ul>  |
| Workforce  | <ul style="list-style-type: none"> <li>• Physiatrist</li> <li>• Physical therapist</li> </ul>   | <ul style="list-style-type: none"> <li>• Physiatrist</li> <li>• Physical therapist trained in thoracic manipulation</li> </ul> |
| Resources  | <ul style="list-style-type: none"> <li>• Physical therapy room</li> </ul>   | <ul style="list-style-type: none"> <li>• Physical therapy room</li> </ul>  |
| Training   | <ul style="list-style-type: none"> <li>• Within competency</li> </ul>   | <ul style="list-style-type: none"> <li>• Within competency</li> </ul>  |
| When is it done  | <ul style="list-style-type: none"> <li>• Upon consultation</li> </ul>   | <ul style="list-style-type: none"> <li>• Upon consultation</li> </ul>  |
| Reassessment using at least one standard outcome measure | <ul style="list-style-type: none"> <li>• Four to six weeks</li> </ul>   | <ul style="list-style-type: none"> <li>• Four to six weeks</li> </ul>  |

<sup>+</sup>Cervical manipulation should be given only by a professional who is registered to practice in the Philippines (i.e. physician, PT), with recognized and credible training, approved by any of the following: Professional Regulation Commission (PRC), Department of Health (DOH), or their respective professional organization/s; and can provide documented evidence of safe and evidence-based practice.

# 8 Neck Pain with Myofascial Pain Syndrome

Neck pain with Myofascial Pain Syndrome (MPS), or commonly known as Cervical MPS, is a dominating cause of muscular disability of the neck and shoulder, and is defined as a regional muscular pain characterized by the presence of a hyperactive or hypersensitive points called “trigger points (TrP)” in a taut band of skeletal muscle with associated referred pain. This syndrome is characterized by: chronic muscle stiffness, palpable hard texture of muscles, early fatigue of muscles, a possible association with tension headache, and presence of myofascial trigger points. Pain can be directly caused by TrPs in the muscles of the neck and shoulder (sternocleidomastoid, scalenes, levator scapulae, trapezius, suboccipital and posterior cervical muscles). Postural stresses are among the most common causes of neck pain, while shoulder pain and restricted shoulder movement can be the result of overuse. It is important for the clinician who is treating the patient to correlate the medical history and physical examination with appropriate imaging results to exclude other causes of neck pain and determine the actual musculoskeletal pain generator. The goal of treatment is to restore the balance between the muscles working as a functional unit.

## 8.1. MANAGEMENT FOR NECK PAIN WITH MYOFASCIAL PAIN SYNDROME

### 8.1.1. Myofascial Release and Ischemic Compression Therapy

**Table 55.** Myofascial release and ischemic compression therapy for neck pain with myofascial pain syndrome

| Recommendation  | Guideline | Level of Evidence | Reference               |
|---|-----------|-------------------|-------------------------|
| There is some evidence that Myofascial Release (Manual Pressure Release) can reduce tenderness (pain pressure threshold) in patients who have neck pain with myofascial pain syndrome                                       | Ottawa    | I                 | Fryer & Hodgson, 2005   |
| Low volume – Non-current  |           |                   |                         |
| There is some evidence that Ischemic Compression Therapy with passive stretching provides relief of pain and tenderness in patients who have neck pain with myofascial pain syndrome, compared to passive stretching alone. | Ottawa    | I                 | Kostopoulos et al, 2008 |
| Low volume – Current  |           |                   |                         |

- PARM recommends myofascial release (manual pressure release) and ischemic compression therapy with passive stretching, for patients with neck pain with myofascial pain syndrome.

## 8.2 PARM CONTEXT POINTS FOR NECK PAIN WITH MYOFASCIAL PAIN SYNDROME

**Table 56.** Context points for minimum and additional standard care of practice for neck pain with myofascial pain syndrome

|  | <b>Minimum standard care of practice</b>   | <b>Additional standard care of practice</b> |
|--|--|---|
| Practice method  | <ul style="list-style-type: none"> <li>• History-taking</li> <li>• Physical examination</li> <li>• Myofascial release</li> <li>• Ischemic compression therapy</li> </ul> | *no additional standard of care needed      |
| Workforce  | <ul style="list-style-type: none"> <li>• Physiatrist</li> <li>• Physical therapist</li> </ul>  |   |
| Resources  | <ul style="list-style-type: none"> <li>• Physical therapy room</li> </ul>  |   |
| Training   | <ul style="list-style-type: none"> <li>• Within competency</li> </ul>  |   |
| When is it done  | <ul style="list-style-type: none"> <li>• Upon consultation</li> </ul>  |   |
| Reassessment using at least one standard outcome measure | <ul style="list-style-type: none"> <li>• Four to six weeks</li> </ul>  |   |

# Abbreviations

|                 |   |
|-----------------|---|
| <b>AGREE</b>    | Appraisal of Guidelines Research and Evaluation                                 |
| <b>ACD</b>      | Anterior Cervical Discectomy  |
| <b>ACDF</b>     | Anterior Cervical Discectomy and Fusion   |
| <b>ACF</b>      | Anterior Cervical Fusion  |
| <b>APTA</b>     | American Physical Therapy Association   |
| <b>CCSR</b>     | Canadian Cervical Spine Rule  |
| <b>CPG</b>      | Clinical Practice Guidelines  |
| <b>CSQ-CAT</b>  | Coping Strategies Questionnaire – Catastrophizing subscale                      |
| <b>CT scan</b>  | Computed Tomography scan or Computed Axial Tomography (CAT scan)                |
| <b>EBP</b>      | Evidence Based Practice   |
| <b>EMG</b>      | Electromyography examination  |
| <b>GDG</b>      | Guideline Development Group   |
| <b>GPP</b>      | Good Practice Points  |
| <b>iCAHE</b>    | International Centre for Allied Health Evidence (University of South Australia) |
| <b>MPS</b>      | Myofascial Pain Syndrome  |
| <b>MRI</b>      | Magnetic Resonance Imaging  |
| <b>NASS</b>     | North American Spine Society  |
| <b>NDI</b>      | Neck Disability Index   |
| <b>NHMRC</b>    | National Health and Medical Research Center                                     |
| <b>NICE</b>     | National Institute for Clinical Excellence                                      |
| <b>NSAIDs</b>   | Non-steroidal Anti-inflammatory Drugs   |
| <b>NZGG</b>     | New Zealand Guidelines Group  |
| <b>PARM</b>     | Philippine Academy of Rehabilitation Medicine                                   |
| <b>PSFS</b>     | Patient-Specific Functional Scale   |
| <b>PLF</b>      | Posterior Laminoforaminotomy  |
| <b>SES</b>      | Self-Efficacy Scale   |
| <b>SIGN</b>     | Scottish Intercollegiate Guidelines Network                                     |
| <b>TDA</b>      | Total Disc Arthroplasty   |
| <b>TENS/TNS</b> | Transcutaneous Electrical Nerve Stimulation                                     |
| <b>TracSA</b>   | Trauma and Injury Recovery  |
| <b>VAS</b>      | Visual Analog Scale   |
| <b>WAD</b>      | Whiplash-associated Disease   |

# Index

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## FIGURES

**Figure 1** Example of a typical patient journey involving the evaluation, diagnosis and treatment of neck pain.....18

**Box 1** PARM standard writing guide.....22

## TABLES

**Table 1** iCAHE critical appraisal tool for clinical guidelines.....20

**Table 2** PARM guide for summarizing the underpinning strength of the body of evidence of included recommendations.....23

**Table 3** PARM guide for writing recommendations.....24

**Table 4** iCAHE scores of the included clinical practice guidelines and the assigned tag used in the PARM low back pain guideline.....26

**Table 5** APTA guideline classification of evidence strength.....27

**Table 6** TracSA guideline classification of evidence strength.....27

**Table 7** Ottawa guideline classification of evidence strength.....28

**Table 8** NASS guideline classification of evidence strength.....28

**Table 9** A summary of the low and high evidence ratings for each of the included clinical guideline practices.....29

**Table 10** Pathoanatomical diagnosis in neck pain.....33

**Table 11** Considering Risk factors in neck pain.....34

**Table 12** Identifying psychosocial factors in neck pain .....34

**Table 13** Identifying and referring serious neck conditions.....35

**Table 14** Assessing neck trauma.....35

**Table 15** Classifying acute mechanical neck pain.....36

|   |    |
|---|----|
| <b>Table 16</b> Outcome measures for neck pain in general.....  | 36 |
| <b>Table 17</b> Cervical manipulation, thoracic manipulation, cervical traction for acute mechanical neck pain.....                                   | 37 |
| <b>Table 18</b> Western massage for sub-acute mechanical neck pain .....  | 37 |
| <b>Table 19</b> Therapeutic Exercises: Flexibility/stretching, coordination, strengthening, endurance exercises for chronic mechanical neck pain..... | 38 |
| <b>Table 20</b> Cervical manipulation, thoracic manipulation, cervical traction for chronic mechanical neck pain.....                                 | 38 |
| <b>Table 21</b> Massage: traditional Chinese massage, Western massage, Swedish massage for chronic mechanical neck pain.....                          | 39 |
| <b>Table 22</b> Context points for minimum and additional standard care of practice for management of mechanical neck pain.....                       | 40 |
| <b>Table 23</b> Typical symptoms of cervical radiculopathy.....   | 41 |
| <b>Table 24</b> Atypical symptoms of cervical radiculopathy.....  | 41 |
| <b>Table 25</b> Neurological testing for cervical radiculopathy.....  | 42 |
| <b>Table 26</b> Special tests for cervical radiculopathy.....   | 42 |
| <b>Table 27</b> Computed Tomography (CT), CT Myelography and Magnetic Resonance Imaging (MRI) for cervical radiculopathy.....                         | 43 |
| <b>Table 28</b> Electromyography for patients with cervical radiculopathy .....   | 44 |
| <b>Table 29</b> Selective nerve block for cervical radiculopathy .....  | 44 |
| <b>Table 30</b> Outcome measures for cervical radiculopathy.....  | 45 |
| <b>Table 31</b> Cervical manipulation, cervical traction, neural mobilization and combination therapy in cervical radiculopathy.....                  | 46 |
| <b>Table 32</b> Addressing psychosocial factors in cervical radiculopathy.....  | 47 |
| <b>Table 33</b> Interventional/invasive procedures in cervical radiculopathy.....   | 47 |
| <b>Table 34</b> Surgical management of cervical radiculopathy.....  | 48 |

|   |    |
|---|----|
| <b>Table 35</b> Context points for minimum and additional standard care of practice for management of cervical radiculopathy.....             | 50 |
| <b>Table 36</b> History-taking for whiplash-associated disorders.....   | 52 |
| <b>Table 37</b> Physical examination for whiplash-associated disorders.....   | 53 |
| <b>Table 38</b> Grading whiplash-associated disorders.....  | 53 |
| <b>Table 39</b> Outcome measures for whiplash-associated disorders.....   | 54 |
| <b>Table 40</b> Prognosis for whiplash-associated disorders.....  | 55 |
| <b>Table 41</b> Physical activity and Exercises for acute whiplash injury.....  | 57 |
| <b>Table 42</b> Cervical manipulation, cervical collar, physical modalities for acute whiplash injury.....                                    | 58 |
| <b>Table 43</b> Pharmacological agents for acute whiplash injury.....   | 59 |
| <b>Table 44</b> Interventional procedures for acute whiplash injury.....  | 60 |
| <b>Table 45</b> Surgical management for acute whiplash injury.....  | 60 |
| <b>Table 46</b> Physical activity and exercises for chronic whiplash disease.....   | 60 |
| <b>Table 47</b> Cognitive Behavioral Approach, Cervical Manipulation, Cervical Collar, Physical Modalities for chronic whiplash disease ..... | 61 |
| <b>Table 48</b> Pharmacological Agents for chronic whiplash disease.....  | 62 |
| <b>Table 49</b> Interventional Procedures for chronic whiplash disease.....   | 62 |
| <b>Table 50</b> Surgical Management of chronic whiplash disease.....  | 63 |
| <b>Table 51</b> Context points for minimum and additional standard care of practice for management of whiplash-associated disorder.....       | 64 |
| <b>Table 52</b> Classifying Cervicocranial Syndrome.....  | 66 |
| <b>Table 53</b> Cervical manipulation, specific exercises for cervicocranial syndrome .....   | 67 |
| <b>Table 54</b> Context points for minimum and additional standard care of practice for management of cervicocranial syndrome.....            | 68 |

**Table 55** Management for neck pain with MPS: myofascial release and ischemic  
compression therapy.....69

**Table 56** Context points for minimum and additional standard care of practice for management  
of neck pain with myofascial pain syndrome.....70

# Appendices

**Table A1. iCAHE scores for each included clinical practice guideline.**

| <b>Criteria</b>   | <b>APTA</b> | <b>TracSA</b> | <b>NASS</b> | <b>Ottawa</b> |
|---|-------------|---------------|-------------|---------------|
| <b>1. Availability</b>  |             |               |             |               |
| Is the guideline readily available in full text?  | 1           | 1             | 1           | 1             |
| Does the guideline provide a complete reference list?   | 1           | 1             | 1           | 1             |
| Does the guideline provide a summary of its recommendations?  | 1           | 1             | 1           | 1             |
| <b>2. Date</b>  |             |               |             |               |
| Is there a date of completion available?  | 1           | 0             | 0           | 0             |
| Does the guideline provide an anticipated review date?  | 1           | 1             | 0           | 0             |
| Does the guideline provide dates for when literature was included?  | 1           | 1             | 1           | 1             |
| <b>3. Underlying evidence</b>   |             |               |             |               |
| Does the guideline provide an outline of the strategy they used to find underlying evidence?                                  | 1           | 1             | 1           | 1             |
| Does the guideline use a hierarchy to rank the quality of the underlying evidence?  | 1           | 1             | 1           | 1             |
| Does the guideline appraise the quality of the evidence which underpins its recommendations?                                  | 1           | 1             | 1           | 1             |
| Does the guideline link the hierarchy and quality of underlying evidence to each recommendation?                              | 1           | 1             | 1           | 1             |
| <b>4. Guideline developers</b>  |             |               |             |               |
| Are the developers of the guideline clearly stated?   | 1           | 1             | 1           | 1             |
| Does the qualifications and expertise of the guideline developer(s) link with the purpose of the guideline and its end users? | 1           | 1             | 1           | 1             |
| <b>5. Guideline purpose and users</b>   |             |               |             |               |
| Are the purpose and target users of the guideline stated?   | 1           | 1             | 1           | 0             |
| <b>6. Ease of use</b>   |             |               |             |               |

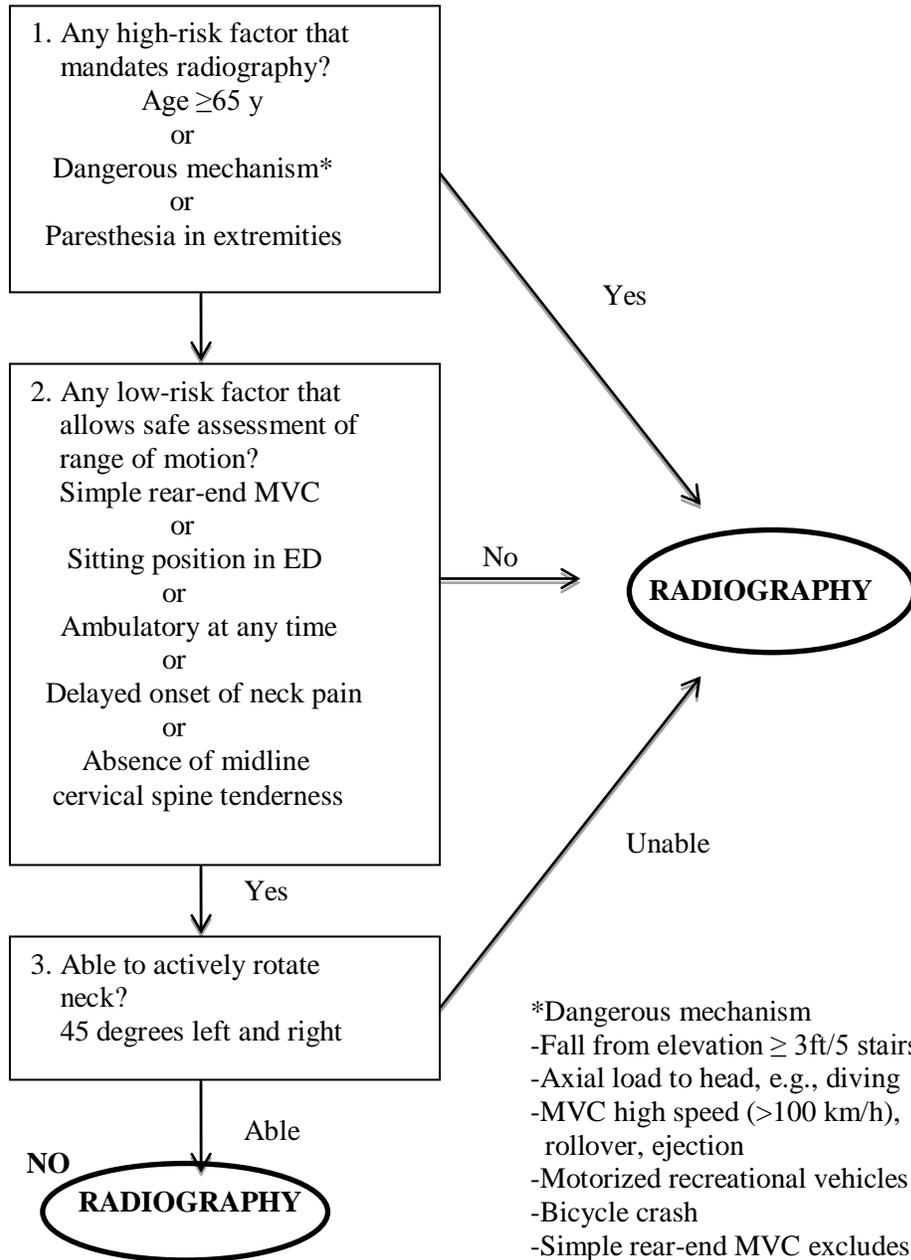
|   |           |           |           |           |
|---|-----------|-----------|-----------|-----------|
| Is the guideline readable and easy to navigate? | 1         | 1         | 1         | 1         |
| <b>TOTAL SCORES</b>                             | <b>14</b> | <b>13</b> | <b>12</b> | <b>11</b> |

\* 1 = criterion met ; 0 = criterion not met

**Table A2. Canadian Cervical Spine Rule (CCSR)**

**The Canadian C-Spine Rule**

For alert (GCS score = 15) and stable trauma patients  
when cervical spine injury is a concern



**Table A3. Neck Disability Index (NDI)**

**NECK PAIN AND DISABILITY INDEX (Vernon-Mior)**

Patient Name: \_\_\_\_\_ File# \_\_\_\_\_ Date: \_\_\_\_\_

**PLEASE READ INSTRUCTIONS:**

*This questionnaire has been designed to give the doctor 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 ONE box which applies to you. We realize you may consider that two of the statements in any one section relate to you, but just mark the box which most closely describes your problem.*

|  |  |
|--|--|
| <p><b>SECTION 1 – PAIN INTENSITY</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> I have no pain at the moment.</li> <li><input type="radio"/> The pain is very mild at the moment.</li> <li><input type="radio"/> The pain is moderate at the moment.</li> <li><input type="radio"/> The pain is fairly severe at the moment.</li> <li><input type="radio"/> The pain is very severe at the moment.</li> <li><input type="radio"/> The pain is the worst imaginable at the moment.</li> </ul> <p><b>SECTION 2 –PERSONAL CARE</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> I can look after myself normally without causing extra pain.</li> <li><input type="radio"/> I can look after myself normally but it causes extra pain.</li> <li><input type="radio"/> It is painful to look after myself and I am slow and careful.</li> <li><input type="radio"/> I need some help but manage most of my personal care.</li> <li><input type="radio"/> I need help everyday in most aspects of self-care.</li> <li><input type="radio"/> I do not get dressed, I wash with difficulty and stay in bed.</li> </ul> <p><b>SECTION 3- LIFTING</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> I can lift heavy weights without extra pain.</li> <li><input type="radio"/> I can lift heavy weights but it gives extra pain.</li> <li><input type="radio"/> Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned.</li> <li><input type="radio"/> I can lift very light weights.</li> <li><input type="radio"/> I cannot lift or carry anything at all.</li> </ul> <p><b>SECTION 4 – READING</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> I can read as much as I want to with no pain in my neck.</li> <li><input type="radio"/> I can read as much as I want to with slight pain in my neck.</li> <li><input type="radio"/> I can read as much as I want with moderate pain in my neck.</li> <li><input type="radio"/> I can't read as much as I want because of moderate pain in my neck.</li> <li><input type="radio"/> I can hardly read at all because of severe pain in my neck.</li> <li><input type="radio"/> I cannot read at all.</li> </ul> <p><b>SECTION 5- HEADACHES</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> I have no headaches at all.</li> <li><input type="radio"/> I have slight headaches which come infrequently.</li> <li><input type="radio"/> I have moderate headaches which come infrequently.</li> <li><input type="radio"/> I have moderate headaches which come frequently.</li> <li><input type="radio"/> I have severe headaches which come frequently.</li> <li><input type="radio"/> I have headaches almost all the time.</li> </ul> | <p><b>SECTION 6 – CONCENTRATION</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> I can concentrate fully when I want to with no difficulty.</li> <li><input type="radio"/> I can concentrate fully when I want to with slight difficulty.</li> <li><input type="radio"/> I have a fair degree of difficulty in concentrating when I want to.</li> <li><input type="radio"/> I have a lot of difficulty in concentrating when I want to.</li> <li><input type="radio"/> I have a great deal of difficulty in concentrating when I want to.</li> <li><input type="radio"/> I cannot concentrate at all.</li> </ul> <p><b>SECTION 7 – WORK</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> I can do as much work as I want.</li> <li><input type="radio"/> I can only do my usual work, but no more.</li> <li><input type="radio"/> I can do most of my usual work, but no more.</li> <li><input type="radio"/> I cannot do my usual work.</li> <li><input type="radio"/> I can hardly do any work at all.</li> </ul> <p><b>SECTION 8 – DRIVING</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> I can drive my car without any neck pain.</li> <li><input type="radio"/> I can drive my car as long as I want with slight pain in my neck.</li> <li><input type="radio"/> I can drive my car as long as I want with moderate pain in my neck.</li> <li><input type="radio"/> I can hardly drive at all because of severe pain in my neck.</li> <li><input type="radio"/> I can't drive my car at all.</li> </ul> <p><b>SECTION 9 – SLEEPING</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> I have no trouble sleeping.</li> <li><input type="radio"/> My sleep is slightly disturbed (less than 1 hour sleepless).</li> <li><input type="radio"/> My sleep is mildly disturbed (1-2 hours sleepless).</li> <li><input type="radio"/> My sleep is moderately disturbed (2-3 hours sleepless).</li> <li><input type="radio"/> My sleep is greatly disturbed (3-5 hours sleepless).</li> <li><input type="radio"/> My sleep is completely disturbed (5-7 hours sleepless).</li> </ul> <p><b>SECTION 10 – RECREATION</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> I am able to engage in all my recreation activities with no neck pain at all.</li> <li><input type="radio"/> I am able to engage in all my recreation activities with some pain in my neck.</li> <li><input type="radio"/> I am able to engage in most, but not all of my usual recreation activities because of pain in my neck.</li> <li><input type="radio"/> I am able to engage in few of my usual recreation activities because of pain in my neck.</li> <li><input type="radio"/> I can hardly do any recreation activities because of pain in my neck.</li> <li><input type="radio"/> I can't do any recreation activities at all.</li> </ul> |
|--|--|

**Pain scale:** Rate the severity of your pain by checking one box on the following scale.

No Pain

|   |   |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|---|---|----|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|

Excruciating Pain

**Table A4. Patient-Specific Functional Scale (PSFS)**

| <b>Patient-Specific Functional Scale</b>  |            |  |  |  |  |  |  |  |  |  |
|---|------------|--|--|--|--|--|--|--|--|--|
| <p>CLINICIAN TO READ AND FILL IN BELOW: Complete at the end of the history and prior to physical examination.</p> <p>Initial assessment:<br/>I am going to ask you to identify up to three important activities that you are unable to do or are having difficulty with as a result of your problem. Today, are there any activities that you are unable to do or having difficulty with because of your problem? (Clinician: show scale to patient and have the patient rate each activity.)</p> <p>Follow-up assessments:<br/>When I assessed you on (state previous assessment date), you told me that you had difficulty with (read all activities from list at a time.) Today, do you still have difficulty with: (read and have patient score each item in the list)?</p> |            |  |  |  |  |  |  |  |  |  |
| PAIN QUESTION SET   |            |  |  |  |  |  |  |  |  |  |
| <p>Scoring scale</p> <p>0    1    2    3    4    5    6    7    8    9    10</p> <p>Unable to perform activity <span style="float: right;">Able to perform activity pre-injury level</span></p>   |            |  |  |  |  |  |  |  |  |  |
| Activity  | Date/Score |  |  |  |  |  |  |  |  |  |
| 1.  |            |  |  |  |  |  |  |  |  |  |
| 2.  |            |  |  |  |  |  |  |  |  |  |
| 3.  |            |  |  |  |  |  |  |  |  |  |
| 4.  |            |  |  |  |  |  |  |  |  |  |
| 5.  |            |  |  |  |  |  |  |  |  |  |
| PAIN LIMITATION   |            |  |  |  |  |  |  |  |  |  |
| <p>Over the past 24 hours, has the pain limited you from performing any of your normal daily activities?</p> <p>0    1    2    3    4    5    6    7    8    9    10</p> <p>Activities have been severely limited <span style="float: right;">Activities have not been limited</span></p>   |            |  |  |  |  |  |  |  |  |  |
| PAIN INTENSITY  |            |  |  |  |  |  |  |  |  |  |
| <p>Over the past 24 hours, how bad has your pain been?</p> <p>0    1    2    3    4    5    6    7    8    9    10</p> <p>No pain <span style="float: right;">Pain as bad as It can be</span></p>   |            |  |  |  |  |  |  |  |  |  |

**Table A5. Quebec Task Force Whiplash-Associated Disease Classification**

| <b>Grade</b> | <b>Classification</b>  |
|--------------|--|
| <b>0</b>     | No complaint about the neck<br>No physical sign(s)   |
| <b>I</b>     | Neck complaint of pain, stiffness or tenderness only<br>No physical sign(s)  |
| <b>II</b>    | Neck complaint AND musculoskeletal sign(s)<br>Musculoskeletal signs include decreased range of motion and point tenderness               |
| <b>III</b>   | Neck complaint AND neurological sign(s)<br>Neurological signs include decreased or absent tendon reflexes, weakness and sensory deficits |
| <b>IV</b>    | Neck complaint AND fracture or dislocation   |

### **Table A6. Self-Efficacy Scale (SES)**

The Self-Efficacy Scale (SES) was initially designed to measure perceived self-efficacy in performing 20 common activities relevant to patients with chronic low back pain

Subjects are asked to rate how confident they are to perform each of a number of activities in spite of pain. The activities covered are listed below. The response format is 11-grade numerical rating scales where 0 = not at all confident and 10 = very confident. The total range is 0–200 points with higher scores indicating higher perceived self-efficacy.

#### **Items:**

- \_\_\_\_\_ Taking out the trash
- \_\_\_\_\_ Concentrating on a project
- \_\_\_\_\_ Going shopping
- \_\_\_\_\_ Playing cards
- \_\_\_\_\_ Shoveling snow
- \_\_\_\_\_ Driving the car
- \_\_\_\_\_ Eating in a restaurant
- \_\_\_\_\_ Watching television
- \_\_\_\_\_ Visiting friends
- \_\_\_\_\_ Working on the car
- \_\_\_\_\_ Raking leaves
- \_\_\_\_\_ Writing a letter
- \_\_\_\_\_ Doing a load of laundry
- \_\_\_\_\_ Working on a house repair
- \_\_\_\_\_ Going to a movie
- \_\_\_\_\_ Washing the car
- \_\_\_\_\_ Riding a bicycle
- \_\_\_\_\_ Going on vacation
- \_\_\_\_\_ Going to a park
- \_\_\_\_\_ Visiting relatives

**Table A7. Coping Strategies Questionnaire – Catastrophizing Subscale (CSQ-CAT)**

The CSQ is a 50-item self-report questionnaire designed to assess 6 cognitive coping responses to pain and 2 behavioral responses. Subjects rate the frequency of their use of each coping strategy on a 7-point Likert-type scale, from (0) “Never” through (3) “Sometimes” to (6) “Always”.

The Catastrophizing subscale of the CSQ (CSQ-CAT) has 6 items:

**It’s terrible and I feel it’s never going to get any better.**

|       |   |   |           |   |   |        |
|-------|---|---|-----------|---|---|--------|
| 0     | 1 | 2 | 3         | 4 | 5 | 6      |
| Never |   |   | Sometimes |   |   | Always |

**It’s awful and I feel that it overwhelms me.**

|       |   |   |           |   |   |        |
|-------|---|---|-----------|---|---|--------|
| 0     | 1 | 2 | 3         | 4 | 5 | 6      |
| Never |   |   | Sometimes |   |   | Always |

**I feel my life isn’t worth living.**

|       |   |   |           |   |   |        |
|-------|---|---|-----------|---|---|--------|
| 0     | 1 | 2 | 3         | 4 | 5 | 6      |
| Never |   |   | Sometimes |   |   | Always |

**I worry all the time about whether it will end.**

|       |   |   |           |   |   |        |
|-------|---|---|-----------|---|---|--------|
| 0     | 1 | 2 | 3         | 4 | 5 | 6      |
| Never |   |   | Sometimes |   |   | Always |

**I feel I can’t stand it anymore.**

|       |   |   |           |   |   |        |
|-------|---|---|-----------|---|---|--------|
| 0     | 1 | 2 | 3         | 4 | 5 | 6      |
| Never |   |   | Sometimes |   |   | Always |

**I feel like I can’t go on.**

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|

# References

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ADAPTE Collaboration; 2007 URL: <http://www.adapte.org/www/rubrique/the-adapte-collaboration.php>

Agarwal R, Kalita J, Misra UK. Barriers to evidence-based medicine practice in South Asia and possible solutions. *Neurol Asia* 2008; 13:87-94.

AGREE. Advancing the science of practice guidelines; 2010. URL: [www.agreetrust.org](http://www.agreetrust.org)

Alrawi MF, Khalil NM, Mitchell P, Hughes SP. The value of neurophysiological and imaging studies in predicting outcome in the surgical treatment of cervical radiculopathy. *Eur Spine J.* Apr 2007;16(4):495-500.

Anderberg L, Annertz M, Persson L, Brandt L, Saveland H. Transforaminal steroid injections for the treatment of cervical radiculopathy: a prospective and randomised study. *Eur Spine J.* Mar 2007;16(3):321-328.

Anderberg L, Annertz M, Rydholm U, Brandt L, Saveland H. Selective diagnostic nerve root block for the evaluation of radicular pain in the multilevel degenerated cervical spine. *Eur Spine J.* Jun 2006;15(6):794-801.

Anderberg L, Saveland H, Annertz M. Distribution patterns of transforaminal injections in the cervical spine evaluated by multi-slice computed tomography. *Euro Spine J.* Oct 2006;15(10):1465-1471.

Antonaci F, Ghirmai S, Bono G, Sandrini G, Nappi G. Cervicogenic headache: evaluation of the original diagnostic criteria. *Cephalgia.* 2001;21:573-583.

Ashkan K, Johnston P, Moore AJ. A comparison of magnetic resonance imaging and neurophysiological studies in the assessment of cervical radiculopathy. *Br J Neurosurg.* Apr 2002;16(2):146-148.

Atherton K, Wiles NJ, Lecky FE, Hawes SJ, Silman AJ, Macfarlane GJ, et al. Predictors of persistent neck pain after whiplash injury. *Emerg Med J.* 2006;23(3):195-201.

Attia J, Hatala R, Cook DJ, Wong JG. The rational clinical examination. Does this adult patient have acute meningitis? *JAMA.* 1999;282:175-181.

Bandiera G, Stiell IG, Wells GA, Clement C, De Maio V, Vandemheen KL, et al. 'The Canadian C-spine rule performs better than unstructured physician judgement. *Ann Emerg Med.* 2003;42(3):395-402.

Barlocher CB, Barth A, Krauss JK, Binggeli R, Seiler RW. Comparative evaluation of microdiscectomy only, autograft fusion, polymethylmethacrylate interposition, and threaded titanium cage fusion for treatment of single-level cervical disc disease: a prospective randomized study in 125 patients. *Neurosurg Focus*. Jan 15 2002;12(1):E4.

Bartlett RJV, Hill CR, Gardiner E. A comparison of T2 and gadolinium enhanced MRI with CT myelography in cervical radiculopathy. *Br J Radiol*. Jan 1998;71(JAN.):11-19.

Berglund A, Bodin L, Jensen I, Wiklund A, Alfredsson L. The influence of prognostic factors on neck pain intensity, disability, anxiety and depression over a 2-year period in subjects with acute whiplash injury. *Pain*. 2006;125(3):244-256.

Bernhardt M, Hynes RA, Blumme HW, White AA, 3<sup>rd</sup>. Cervical spondylotic myelopathy. *J Bone Joint Surg Am*. 1993;75:119-128.

Bertilson BC, Grunnesjo M, Strender LE. Reliability of clinical tests in the assessment of patients with neck/shoulder problems-impact of history. *Spine (Phila Pa 1976)*. Oct 1 2003;28(19):2222-2231.

Boden SD, Davis DO, Dina TS, Patronas NJ, Wiesel SW. Abnormal magnetic resonance scans of the lumbar spine in asymptomatic subjects: A prospective investigation. *J Bone Joint Surg Am*. 1990; 72:404-408.

Bogduk N, Marsland A. The cervical zygapophysial joints as a source of neck pain. *Spine*. 1988;13:610-617.

Bonk AD, Ferrari R, Giebel GD, Edelmann M, Huser R. Prospective, Randomised, Controlled Study of Activity versus Collar, and the natural history for Whiplash Injury, in Germany. *J Musc Pain*. 2000;8(1-2):123-132.

Bono CM, Ghiselli G, Gilbert TJ, Kreiner DS, Reitman C, Summers JT, et al. North American Spine Society. An evidence-based clinical guideline for the diagnosis and treatment of cervical radiculopathy from degenerative disorders. *Spine J*. 2011 Jan;11(1):64-72.

Borchgrevink GE, Kaasa A, McDonagh D, Stiles TC, Haraldseth O, Lereim I. Acute treatment of whiplash neck sprain injuries. A randomized trial of treatment during the first 14 days after a car accident. *Spine*. 1998;23(1):25-31.

Borchgrevink GE, Smevik O, Nordby A, Rinck PA, Stiles TC, Lereim I. MR imaging and radiography of patients with cervical hyperextension-flexion injuries after car accidents. *Acta Radiol*. 1995;36(4):425-428.

Bot SD, van der Waal JM, Terwee CB, et al. Predictors of outcome in neck and shoulder symptoms: a cohort study in general practice. *Spine*. 2005;30:E459-470.

Brosseau L, Wells GA, Tugwell P, Casimiro L, Novikov M, Loew L, et al. Ottawa Panel evidence-based clinical practice guidelines on therapeutic massage for neck pain. *J Bodyw Mov Ther.* 2012 Jul;16(3):300-25.

Browder DA, Erhard RE, Piva SR. Intermittent cervical traction and thoracic manipulation for management of mild cervical compressive myelopathy attributed to cervical herniated disc: a case series. *J Ortho Sports Phys Ther.* 2004;34:701-712. <http://dx.doi.org/10.2519/jospt.2004.1519>

Bruce MG, Rosenstein NE, Capparella JM, Shutt KA, Perkins BA, Collins M. Risk factors for meningococcal disease in college students. *JAMA.* 2001;286:688-693.

Buitenhuis J, de Jong PJ, Jaspers JP, Groothoff JW. Relationship between posttraumatic stress disorder symptoms and the course of whiplash complaints. *J Psychosom Res.* 2006;61(5):681-689.

Burns R, Abdi S. (2011). Myofascial neck pain disorders. In N Mehta, GE Maloney, DS Bana, SJ Scrivani (Eds.), *Head, face, and neck pain science, evaluation, and management: an interdisciplinary approach* (Chapter 32). Hoboken, NJ: John Wiley & Sons.

Byrn C, Olsson I, Falkheden L, Lindh M, Hosterey U, Fogelberg M, et al. Subcutaneous sterile water injections for chronic neck and shoulder pain following whiplash injuries. *Lancet.* 1993;341(8843):449-452.

Carroll LJ, Hogg-Johnson S, Côté P, van der Velde G, Holm LW, Carragee EJ et al. Course and prognostic factors for neck pain in workers: results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. *Spine (Phila Pa 1976).* 2008 Feb 15;33(4 Suppl):S93-100.

Cen, S.Y., Loy, S.F., Sletten, E.G., McLaine, A. The effect of traditional Chinese Therapeutic Massage on individuals with neck pain. *Clinical Acupuncture and Oriental Medicine.* 2003;4:88-93.

Chang H, Park JB, Hwang JY, Song KJ. Clinical analysis of cervical radiculopathy causing deltoid paralysis. *Eur Spine J.* Oct 2003;12(5):517-521.

Childs JD, Cleland JA, Elliot JM, Teyhen DS, Wainner RS, Whitman JM, Sopky BJ, Godges JJ, Flynn TW. Neck pain: clinical practice guidelines linked to the international classification of functioning, disability, and health from the orthopaedic section of the American Physical Therapy Association. *J Orthop Sports Phys Ther.* 2008;38(9):A1-A34. Doi:10.2519/jospt.2008.0303

Chinnock P, Siegfried N, Clarke M. Is evidence-based medicine relevant to the developing world? *PLoS Med* 2005; 2 (5): e107.

Cleland JA, Childs JD, McRae M, Palmer JA, Stowell T. Immediate effects of thoracic manipulation in patients with neck pain: a randomized clinical trial. *Man Ther.* 2005;10:127-135. <http://dx.doi.org/10.1016/j.math.2004.08.005>.

Cleland JA, Childs JD, Whitman JM. Psychometric properties of the Neck Disability Index and Numeric Pain Rating Scale in patients with mechanical neck pain. *Arch Phys Med Rehabil.* 2008;89:69-74. <http://dx.doi.org/10.1016/j.apmr.2007.08.126>.

Cleland JA, Fritz JM, Whitman JM, Heath R. predictors of short-term outcome in people with clinical diagnosis of cervical radiculopathy. *Phys Ther.* 2007;87:1619-1632. <http://dx.doi.org/10.1016/ptj.20060287>

Cleland JA, Fritz JM, Whitman JM, Palmer JA. The reliability and construct validity of the Neck Disability Index and patient specific functional scale in patients with cervical radiculopathy. *Spine.* 2006;31:598-602. <http://dx.doi.org/10.1097/01.brs.00002012241.90914.22>

Cleland JA, Glynn P, Whitman JM, Eberhart SL, MacDonald C, Childs JD. Short-term effects of thrust versus non-thrust mobilization/manipulation directed at the thoracic spine in patients with neck pain: a randomized clinical trial. *Phys Ther.* 2007;87:431-440. <http://dx.doi.org/10.2522/ptj.20060217>.

Cloward RB. Cervical discography. A contribution to the etiology and mechanism of neck, shoulder and arm pain. *Ann Surg.* 1959;150:1052-1064.

Côté P, Cassidy JD, Carroll L. The Saskatchewan health and back pain survey. The prevalence of neck pain and related disability in Saskatchewan adults. *Spine* 1998;23:1689-98.

Côté P, van der Velde G, Cassidy JD, Carroll LJ, Hogg-Johnson S, Holm LW, Carragee EJ, Haldeman S, Nordin M, Hurwitz EL, Guzman J, Peloso PM. The burden and determinants of neck pain in workers: results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. *Eur Spine J.* 2008 April; 17(Suppl 1): 60-74.

Crawford JR, Khan RJ, Varley GW. Early management and outcome following soft tissue injuries of the neck-a randomised controlled trial. *Injury.* 2004;35(9):891-895.

Crouch R, Whitewick R, Clancy M, Wright P, Thomas P. Whiplash associated disorder: incidence and natural history over the first month for patients presenting to a UK emergency department. *Emerg Med J.* 2006;23(2):114-118.

Cyteval C, Thomas E, Decoux E, et al. Cervical radiculopathy: open study on percutaneous periradicular foraminal steroid infiltration performed under CT control in 30 patients. *AJNR Am J Neuroradiol.* Mar 2004;25(3):441-445.

Dans AL, Dans LF. The burden and determinants of neck pain in workers. *ACP J Club.* 2000 Jul-Aug;133(1):A11-2.

Davidoff RA. Trigger points and myofascial pain: toward understanding how they affect headaches. *Cephalalgia*. 1998 Sep;18(7):436-48.

Davidson RI, Dunn EJ, Metzmaker JN. The shoulder abduction test in the diagnosis of radicular pain in cervical extradural compressive monoradiculopathies. *Spine (Phila Pa 1976)*. Sep-Oct 1981;6(5):441-446.

Delfini R, Dorizzi A, Facchinetti G, Faccioli F, Galzio R, Vangelista T. Delayed post-traumatic cervical instability. *Surg Neurol*. 1999;51:588-594; discussion 594-585.

Dizon JMR, Grimmer-Somers K, Kumar S. A pilot study of the evidence based practice training program for Filipino physiotherapists: Emerging evidence on outcomes and acceptability. *Internet J Allied Health Sci Pract* in review.

Driessen MT, Lin CW, van Tulder MW. Cost-effectiveness of conservative treatments for neck pain: a systematic review on economic evaluations. *Eur Spine J*. 2012 Aug;21(8):1441-50.

Drottning M, Staff PH, Levin L, Malt UF. Acute emotional response to common whiplash predicts subsequent pain complaints: A prospective study of 107 subjects sustaining whiplash injury. *Nord J Psychiatry*. 1995;49(4):293-300.

Eck J, Hodges S, Humphreys C. Whiplash: a review of a commonly misunderstood injury. *Am J Med* 2001;110:651-656.

Ekvall HE, Mansson NO, Ringsberg KA, Hakansson A. Dizziness among patients with whiplash-associated disorder: a randomized controlled trial. *J Rehabil Med*. 2006;38(6):387-390.

Espeleta GP, Pinzon PM, Baliguas B, Estores C, Diamante RJ. Adherence to the clinical practice guidelines of the stroke society of the philippines in the management of ischemic stroke in young adults. *Philipp J Intern Med*. 2011 Oct-Dec;49(4):191-198.

Fejer R, Kyvik KO, Hartvigsen J. The prevalence of neck pain in the world population: a systematic critical review of the literature. *Eur Spine J*. 2006 Jun;15(6):834-48.

Fernandez de las Penas C, Fernandez-Carnero J, Fernandez AP, Lomas-Vega R, Miangolarra-Page JC. Dorsal Manipulation in Whiplash Injury Treatment; a randomised controlled trial. *J Whip Relat Disord*. 2004;3(2):55-72.

Fernandez de las Penas C, Fernandez-Carnero J, Palomeque del Cerro L, Miangolarra-Page JC. Manipulative Treatment versus Conventional Physiotherapy Treatment in Whiplash Injury: a randomised controlled trial. *J Whip Relat Disord*. 2004;3(2):73-90.

Fernandez-Fairen M, Sala P, Dufoo M, Jr., Ballester J, Murcia A, Merzthal L. Anterior cervical fusion with tantalum implant: a prospective randomized controlled study. *Spine*. Mar 1 2008;33(5):465-472.

Field MJ, Lohr KN (Eds.). Guidelines for clinical practice: from development to use. Institute of Medicine, Washington, D.C: National Academy Press; 1992.

Fitz-Ritson D. Phasic exercises for cervical rehabilitation after "whiplash" trauma. *J Manipulative Physiol Ther.* 1995;18(1):21-24.

Foley KT, Mroz TE, Arnold PM, et al. Randomized, prospective, and controlled clinical trial of pulsed electromagnetic field stimulation for cervical fusion. *Spine J.* May 2008;8(3):436-442.

Foley-Nolan D, Moore K, Codd M, Barry C, O'Connor P, Coughlan RJ. Low energy high frequency pulsed electromagnetic therapy for acute whiplash injuries. A double blind randomized controlled study. *Scand J Rehabil Med.* 1992;24(1):51-59.

Foster CA, Jabbour P. Barré-Lieou syndrome and the problem of the obsolete eponym. *J Laryngol Otol.* 2007 Jul;121(7):680-3. Epub 2006 Oct 19.

Fritz JM, Brennan GP. Preliminary examination of a proposed treatment-based classification system for patients receiving physical therapy interventions for neck pain. *Phys Ther.* 2007;87:513-524. <http://dx.doi.org/10.2522/ptj.20060192>.

Fritz JM, George SZ, Delitto A. The role of fear-avoidance beliefs in acute low back pain: relationships with current and future disability and work status. *Pain.* 2001;94:7-15.

Fritz JM, George SZ. Identifying psychosocial variables in patients with acute work-related low back pain: the importance of fear-avoidance beliefs. *Phys Ther.* 2002;82:973-983.

Fryer, G, Hodgson, L. The effect of manual pressure release on myofascial trigger points in the upper trapezius muscle. *Journal of Bodywork and Movement Therapies.* 2005;9:248-255.

Gargan MF, Bannister GC. The rate of recovery following whiplash injury. *Eur Spine J.* 1994;3(3):162-164.

Garner P, Kale R, Dickson R, Dans T, Salinas R. Getting research findings into practice: implementing research findings in developing countries. *BMJ.* 1998 Aug 22;317(7157):531-5.

George SZ, Fritz JM, Erhard RE. A comparison of fear-avoidance beliefs in patients with lumbar spine pain and cervical spine pain. *Spine.* 2001;26:2139-2145.

Gerwin RD. Classification, epidemiology, and natural history of myofascial pain syndrome. *Curr Pain Headache Rep.* 2001 Oct;5(5):412-20.

Graham N, Gross AR, Goldsmith C. Mechanical traction for mechanical neck disorders: a systematic review. *J Rehabil Med.* 2006;38:145-152. <http://dx.doi.org/10.1080/16501970600583029>

Grol R, Grimshaw J. From best evidence to best practice: effective implementation of change in patients' care. *Lancet* 2003; 362:1225–30.

Gross AR, Goldsmith C, Hoving JL, et al. Conservative management of mechanical neck disorders: a systematic review. *J Rheumatol.* 2007;34:1083-1102.

Gross Ar, Hoving JL, Haines TA, et al. a Cochrane review of manipulation and mobilization for mechanical neck disorders. *Spine.* 2004;29:1541-1548.

Gun RT, Osti OL, O'Riordan A, Mpelasoka F, Eckerwall CG, Smyth JF. Risk factors for prolonged disability after whiplash injury: a prospective study. *Spine.* 2005;30(4):386-391.

Gunzberg R. Efficacy of an NSAID (Tenoxicam) in the acute phase of whiplash. *Proc World Cong Whip Assoc Disord.* 1999; 116.

Guyatt GH, Oxman AD, Schünemann HJ, Tugwell P, Knottnerus A. GRADE guidelines: A new series of articles in the Journal of Clinical Epidemiology. *J Clin Epidemiol* 2010; 64:380-2.

Guzman J, Haldeman S, Carroll LJ, Carragee EJ, Hurwitz EL, Peloso P. Clinical practice implications of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders: from concepts and findings to recommendations. *J Manipulative Physiol Ther.* 2009 Feb;32(2 Suppl):S227-43.

Hamburger C, Festenberg FV, Uhl E. Ventral discectomy with pmma interbody fusion for cervical disc disease: long term results in 249 patients. *Spine.* Feb 1 2001;26(3):249-255.

Hauerberg J, Kosteljanetz M, Boge-Rasmussen T, et al. Anterior cervical discectomy with or without fusion with ray titanium cage: a prospective randomized clinical study. *Spine.* Mar 1 2008;33(5):458-464.

Hedberg MC, Drayer BP, Flom RA, Hodak JA, Bird CR. Gradient echo (GRASS) MR imaging in cervical radiculopathy. *AJR Am J Roentgenol.* Mar 1988;150(3):683-689.

Heidecke V, Rainov NG, Marx T, Burkert W. Outcome in Cloward anterior fusion for degenerative cervical spinal disease. *Acta Neurochir (Wien).* 2000;142(3):283-291.

Henderson CM, Hennessy RG, Shuey HM, Jr., Shackelford EG. Posterior-lateral foraminotomy as an exclusive operative technique for cervical radiculopathy: a review of 846 consecutively operated cases. *Neurosurgery.* Nov. 1983;13(5):504-512.

Hendriks EJ, Scholten-Peeters GG, van der Windt DA, Neeleman-van der Steen CW, Oostendorp RA, Verhagen AP. Prognostic factors for poor recovery in acute whiplash patients. *Pain.* 2005;114(3):408-416.

Hendriks O, Horgan A. Ultra-reiz current as an adjunct to standard physiotherapy treatment of the acute whiplash patient. *Physiother Ireland.* 1996;17(1):3-7.

Herkowitz HN, Kurz LT, Overholt DP. Surgical management of cervical soft disc herniation. A comparison between the anterior and posterior approach. *Spine (Phila Pa 1976)*. Oct 1990;15(10):1026-1030.

Hildingsson C, Toolanen G. Outcome after soft-tissue injury of the cervical spine. A prospective study of 93 car-accident victims. *Acta Orthop Scand*. 1990;61(4):357-359.

Hill J, Lewis M, Papageorgiou AC, Dziedzic K, Croft P. Predicting persistent neck pain: a 1-year follow-up of a population cohort. *Spine*. 2004;29:1648-1654.

Hillier S, Grimmer-Somers K, Merlin T, Middleton P, Salisbury J, Tooher R, et al. FORM: An Australian method for formulating and grading recommendations in evidence-based clinical guidelines. *BMC Med Res Methodol* 2011; 11:23.

Hoffman JR, Mower WR, Wolfson AB, Todd KH, Zucker MI. Validity of a set of clinical criteria to rule out injury to the cervical spine in patients with blunt trauma. National Emergency X-Radiography Utilization Study Group. *N Engl J Med*. 2000;343:94-99.

Hoffmann T, Bennett S, Del Mar C. Evidence-based practice across the health professions. Sydney: Churchill Livingstone, Elsevier; 2010.

Houser OW, Onofrio BM, Miller GM, Folger WN, Smith PL, Kallman DA. Cervical Neural Foraminal Canal Stenosis - Computerized Tomographic Myelography Diagnosis. *J Neurosurg*. Jul 1993;79(1):84-88.

Houser OW, Onofrio BM, Miller GM, Folger WN, Smith PL. Cervical Disk Prolapse. *Mayo Clinic Proceedings*. Oct 1995;70(10):939-945.

Hoving JL, de vet HC, Twisk JW, et al. Prognostic factors for neck pain in general practice. *Pain*. 2004;110:639-645. <http://dx.doi.org/10.1016/j.pain.2004.05.002>.

Hoving JL, Koes BW, de Vet HC, et al. Manual therapy, physical therapy, or continued care by a general practitioner for patients with neck pain. A randomized, controlled trial. *Ann Intern Med*. 2002;136:713-722.

Hoy DG, Protani M, De R, Buchbinder R. The epidemiology of neck pain. *Best Pract Res Clin Rheumatol*. 2010 Dec;24(6):783-92.

Ilkko E, Lahde S, Heiskari M. Thin-section CT in the examination of cervical disc herniation. A prospective study with 1-mm axial and helical images. *Acta Radiol*. Mar 1996;37(2):148-152.

Irnich, D., Behrens, N., Molzen, H., Konig, A., Gleditsch, J., Krauss, M., Natalis, M., Senn, E., Beyer, A., Schops, P. Randomised trial of acupuncture compared with conventional massage and "sham" laser acupuncture for treatment of chronic neck pain. *British Journal of Medicine*. 2001;322:1306-1311.

Jaeschke R, Singer J, Guyatt GH. Measurement of health status. Ascertaining the minimal clinically important difference. *Control Clin Trials*. 1989;10:407-415.

Jagannathan J, Sherman JH, Szabo T, Shaffrey CI, Jane JA. The posterior cervical foraminotomy in the treatment of cervical disc/osteophyte disease: a single-surgeon experience with a minimum of 5 years' clinical and radiographic follow-up Clinical article. *J Neurosurg Spine*. Apr 2009;10(4):347-356.

Jagannathan J, Sherman JH, Szabo T, Shaffrey CI, Jane JA. The posterior cervical foraminotomy in the treatment of cervical disc/osteophyte disease: a single-surgeon experience with a minimum of 5 years' clinical and radiographic follow-up. *J Neurosurg Spine*. Apr 2009;10(4):347-356.

Jenis LG, An HS. Neck pain secondary to radiculopathy of the fourth cervical root: an analysis of 12 surgically treated patients. *J Spinal Disord*. Aug 2000;13(4):345-349.

Jett JR. Superior sulcus tumors and Pancoast's syndrome. *Lung Cancer*. 2003;42 Suppl 2:S17-21.

Jette DU, Jette AM. Physical therapy and health outcomes in patients with spinal impairments. *Phys Ther*. 1996;76:930-941; discussion 942-935.

Joghataei MT, Arab AM, Khaksar H. The effect of cervical traction combined with conventional therapy on grip strength on patients with cervical radiculopathy. *Clin Rehabil*. 2004;18:879-887.

Jull G, Sterling M, Kenardy J, Beller E. Does the presence of sensory hypersensitivity influence outcomes of physical rehabilitation for chronic whiplash?--A preliminary RCT. *Pain*. 2007;129(1-2):28-34.

Jull G, Trott P, Potter H, et al. A randomized controlled trial of exercise and manipulative therapy for cervicogenic headache. *Spine*. 2002;27:1835-1843;discussion 1843.

Kasch H, Qerama E, Bach FW, Jensen TS. Reduced cold pressor pain tolerance in non-recovered whiplash patients: a 1-year prospective study. *Eur J Pain EJP*. 2005;9(5):561-569.

Kay TM, Gross A, Goldsmith C, Santaguida PL, Hoving J, Bronfort G. Exercises for mechanical neck disorders. *Cochrane Database Syst Rev*. 2005;CD004250. [Http://dx.doi.org/10.1002/14651858.CD004250.pub3](http://dx.doi.org/10.1002/14651858.CD004250.pub3)

Kim H, Lee SH, Kim MH. Multislice CT fluoroscopy-assisted cervical transforaminal injection of steroids: technical note. *J Spinal Disord Tech*. Aug 2007;20(6):456-461.

Kivioja J, Jensen I, Lindgren U. Early coping strategies do not influence the prognosis after whiplash injuries. *Injury*. 2005;36(8):935-940.

- Kivioja J, Sjalín M, Lindgren U. Psychiatric morbidity in patients with chronic whiplash-associated disorder. *Spine*. 2004;29(11):1235-1239.
- Kolstad F, Leivseth G, Nygaard OP. Transforaminal steroid injections in the treatment of cervical radiculopathy. A prospective outcome study. *Acta Neurochir (Wien)*. Oct 2005;147(10):1065-1070; discussion 1070.
- Korinth MC, Kruger A, Oertel MF, Gilsbach JM. Posterior foraminotomy or anterior discectomy with polymethyl methacrylate interbody stabilization for cervical soft disc disease: results in 292 patients with monoradiculopathy. *Spine*. May 15 2006;31(11):1207-1214; discussion 1215-1206.
- Kostopoulos, D., Nelson, A.J., Ingber, R.S., Larkin, R.W. Reduction of spontaneous electrical activity and pain perception of trigger points in the upper trapezius muscle through trigger point compression and passive stretching. *Journal of Musculoskeletal Pain*. 2008;16 (4), 266-278.
- Kriss TC, Kriss VM. Neck pain. Primary care work-up of acute and chronic symptoms. *Geriatrics*. 2000;; 55:47-48, 51-44,57.
- Kuch K, Cox BJ, Evans RJ, Shuman I. Phobias, panic and pain in 55 survivors of road vehicle accidents. *J Anxiety Disorder*. 1994;8:181-187.
- Kumar N, Gowda V. Cervical foraminal selective nerve root block: a 'two-needle technique' with results. *Eur Spine J*. Apr 2008;17(4):576-584.
- Kyhlback M, Thierfelder T, Soderlund A. Prognostic factors in whiplash-associated disorders. *Int J Rehabil Res*. 2002;25(3):181-187.
- Lidgren L. Preface: neck pain and the decade of the bone and joint 2000-2010. *J Manipulative Physiol Ther*. 2009 Feb;32(2 Suppl):S2-3.
- Lin EL, Lieu V, Halevi L, Shamie AN, Wang JC. Cervical epidural steroid injections for symptomatic disc herniations. *J Spinal Disord Tech*. May 2006;19(3):183-186.
- Linton SJ. A review of psychological risk factors in back and neck pain. *Spine*. 2000;25:1148-1156.
- Li-Yu J, Perez E, Cañete A, Bonifacio L, Llamado L, Martinez R, et al. Consensus statements on osteoporosis diagnosis, prevention and management in the Philippines. *Int J Rheuma Dis* 2011; 14: 223-38.
- Lord SM, Barnsley L, Wallis BJ, McDonald GJ, Bogduk N. Percutaneous radio-frequency neurotomy for chronic cervical zygapophyseal-joint pain. *N Engl J Med*. 1996;335(23):1721-1726.

- Makin GJ, Brown WF, Ebers GC. C7 radiculopathy: importance of scapular winging in clinical diagnosis. *J Neurol Neurosurg Psychiatry*. Jun 1986;49(6):640-644.
- Manahan L, Caragay R, Muirden KD, Allander E, Valkenburg HA, Wigley RD. Rheumatic pain in a Philippine village. A WHO-ILAR COPCORD Study. *Rheumatol Int*. 1985;5(4):149-53.
- Matti PR, Querol RC, Antonio-Velmonte M, de Vera R, Alejandria M. Prescribing practices of surgeons and factors that limit adherence to the Philippine College of Surgeons Clinical Practice Guidelines on Antimicrobial Prophylaxis for elective surgical procedures at the UP-PGH surgical wards. *Phil J Microbiol Infect Dis*. 2002;31:107-24 .
- McDonald S, Turner T, Chamberlain C, Lumbiganon P, Thinkhamrop J, Festin M. et al. Building capacity for evidence generation, synthesis and implementation to improve the care of mothers and babies in South East Asia: methods and design of the SEA-ORCHID Project using a logical framework approach. *BMC Med Res Methodol* 2010; 10:61.
- McKinney LA. Early mobilisation and outcome in acute sprains of the neck. *BMJ*. 1989;299(6706):1006-1008.
- Mealy K, Brennan H, Fenelon GC. Early mobilization of acute whiplash injuries. *Br Med J (Clin Res Ed)*. 1986;292(6521):656-657.
- Minton R, Murray P, Stephenson W, Galasko CS. Whiplash injury--are current head restraints doing their job? *Accid Anal Prev*. 2000;32(2):177-185.
- Modic MT, Masaryk TJ, Mulopulos GP. Cervical radiculopathy: prospective evaluation with surface coil MR imaging, CT with metrizamide, and metrizamide myelography. *Radiology*. 1986;161(3):753-759.
- Moeti P, Marchetti G. clinical outcome from mechanical intermittent cervical traction for the treatment of cervical radiculopathy: a case series. *J OrthopSports Phys ther*. 2001;31:207-213.
- Mummaneni PV, Burkus JK, Haid RW, Traynelis VC, Zdeblick TA. Clinical and radiographic analysis of cervical disc arthroplasty compared with allograft fusion: a randomized- controlled clinical trial. *J Neurosurg Spine*. Mar 2007;6(3):198-209.
- Murphy DR, Hurwitz EL, Gregory A, Clary R. A nonsurgical approach to the management of patients with cervical radiculopathy: a prospective observational cohort study. *J Manipulative Physiol Ther*. 2006;29:279-287. <http://dx.doi.org/10.1016/j.mpt.2006.03.005>
- Murray CJ, Lopez AD. Measuring the global burden of disease. *N Engl J Med*. 2013 Aug 1;369(5):448-57.

- Murrey D, Janssen M, Delamarter R, et al. Results of the prospective, randomized, controlled multicenter Food and Drug Administration investigational device exemption study of the ProDisc-C total disc replacement versus anterior discectomy and fusion for the treatment of 1-level symptomatic cervical disc disease. *Spine J.* Apr 2009;9(4):275-286.
- Nabhan A, Ahlhelm F, Pitzen T, et al. Disc replacement using Pro-Disc C versus fusion: a prospective randomised and controlled radiographic and clinical study. *Euro Spine J.* Mar 2007;16(3):423-430.
- Nabhan A, Ahlhelm F, Shariat K, et al. The ProDisc-C prosthesis - Clinical and radiological experience 1 year after surgery. *Spine.* Aug 2007;32(18):1935-1941.
- Nederhand MJ, Hermens HJ, Ijzerman MJ, Turk DC, Zilvold G. Chronic neck pain disability due to an acute whiplash injury. *Pain.* 2003;102(1-2):63-71.
- Nederhand MJ, Ijzerman MJ, Hermens HJ, Turk DC, Zilvold G. Predictive value of fear avoidance in developing chronic neck pain disability: consequences for clinical decision making. *Arch Phys Med Rehabil.* 2004;85(3):496-501.
- Nilsson N, Christensen W, Hartvigsen J. The effect of spinal manipulation in the treatment of cervicogenic headache. *J Manipulative Physiol Ther.* 1997;20:326-330.
- Nunley PD, Jawahar A, Kerr EJ, 3rd, Cavanaugh DA, Howard C, Brandao SM. Choice of plate may affect outcomes for single versus multilevel ACDF: results of a prospective randomized single-blind trial. *Spine J.* Feb 2009;9(2):121-127.
- Oktenoglu T, Cosar M, Ozer AF, et al. Anterior cervical microdiscectomy with or without fusion. *J Spinal Disord Tech.* Jul 2007;20(5):361-368.
- Olivero WC, Dulebohn SC. Results of halter cervical traction for the treatment of cervical radiculopathy: retrospective review of 81 patients. *Neurosurg Focus.* Feb 15 2002;12(2):ECP1.
- Olsson I, Bunketorp O, Carlsson SG, Styf J. Prediction of outcome in whiplash-associated disorders using West Haven-Yale Multidimensional Pain Inventory. *Clin J Pain.* 2002;18(4):238-244.
- Ozgun BM, Marshall LF. Atypical presentation of C-7 radiculopathy. *J Neurosurg.* Sep 2003;99(2 Suppl):169-171.
- Park JH, Roh KH, Cho JY, Ra YS, Rhim SC, Noh SW. Comparative analysis of cervical arthroplasty using Mobi-C and anterior cervical discectomy and fusion using the Solis-cage. *J Korean Neurosurg Soc.* 2008;44(4):217-221.
- Payne R. Neck pain in the elderly: a management review. Part I. *Geriatrics.* 1987;42:59-62, 65.
- Payne R. Neck pain in the elderly: a management review. Part II. *Geriatrics.* 1987;42:71-73.

Pearce JM. Barré-Liéou "syndrome". *J Neurol Neurosurg Psychiatry*. 2004 Feb;75(2):319.

Peebles JE, McWilliams LA, MacLennan R. A comparison of symptom checklist 90-revised profiles from patients with chronic pain from whiplash and patients with other musculoskeletal injuries. *Spine*. 2001;26:766-770.

Peolsson A, Peolsson M. Predictive factors for long-term outcome of anterior cervical decompression and fusion: a multivariate data analysis. *Eur Spine J*. Mar 2008;17(3):406-414.

Persson LC, Lilja A. Pain, coping, emotional state and physical function in patients with chronic radicular neck pain. A comparison between patients treated with surgery, physiotherapy or neck collar--a blinded, prospective randomized study. *Disabil Rehabil*. May 20 2001;23(8):325- 335.

Persson LC, Moritz U, Brandt L, Carlsson CA. Cervical radiculopathy: pain, muscle weakness and sensory loss in patients with cervical radiculopathy treated with surgery, physiotherapy or cervical collar. A prospective, controlled study. *Eur Spine J*. 1997;6(4):256-266.

Persson LCG, Carlsson JY, Anderberg L. Headache in patients with cervical radiculopathy: A prospective study with selective nerve root blocks in 275 patients. *Euro Spine J*. Jul 2007;16(7):953-959.

Pietrobon R, Coeytaux RR, Carey TS, Richardson WJ, DeVellis RF. Standard scales for measurement of functional outcome for cervical pain or dysfunction: a systematic review. *Spine*. 2002;27:515-522.

Post NH, Cooper PR, Frempong-Boadu AK, Costa ME. Unique features of herniated discs at the cervicothoracic junction: Clinical presentation, imaging, operative management, and outcome after anterior decompressive operation in 10 patients. *Neurosurgery*. Mar 2006;58(3):497-501.

Provinciali L, Baroni M, Illuminati L, Ceravolo MG. Multimodal treatment to prevent the late whiplash syndrome. *Scand J Rehabil Med*. 1996;28(2):105-111.

Qaseem A, Forland F, Macbeth F, Ollenschläger G, Phillips S, Van der Wees P; Board of Trustees of the Guidelines International Network. Guidelines International Network: toward international standards for clinical practice guidelines. *Ann Intern Med*. 2012 Apr 3;156(7):525-31.

Radanov BP, Sturzenegger M, De SG, Schnidrig A. Relationship between early somatic, radiological, cognitive and psychosocial findings and outcome during a one-year follow-up in 117 patients suffering from common whiplash. *Br J Rheumatol*. 1994;33(5):442-448.

Radanov BP, Sturzenegger M, Di SG, Schnidrig A, Aljinovic M. Factors influencing recovery from headache after common whiplash. *BMJ*. 1993;307(6905):652-655.

- Radanov BP, Sturzenegger M, Di SG. Long-term outcome after whiplash injury. A 2-year follow-up considering features of injury mechanism and somatic, radiologic, and psychosocial findings. *Medicine*. 1995;74(5):281-297.
- Radanov BP, Sturzenegger M. Predicting recovery from common whiplash. *Eur Neurol* 1996;36(1):48-51.
- Radanov BP, Sturzenegger M. The Effect of Accident Mechanisms and Initial Findings on the Long-Term Outcome of Whiplash Injury. *J Musc Pain*. 1996;4(4):47-60.
- Radhakrishnan K, Litchy WJ, O'Fallon WM, Kurland LT. Epidemiology of cervical radiculopathy. A population-based study from Rochester, Minnesota, 1976 through 1990. *Brain*. 1994;117 (Pt 2): 325-335.
- Richter M, Ferrari R, Otte D, Kuensebeck HW, Blauth M, Krettek C. Correlation of clinical findings, collision parameters, and psychological factors in the outcome of whiplash associated disorders. *J Neurol Neurosurg Psychiatry*. 2004;75(5):758-764.
- Riddle DL, Stratford PW. Use of generic versus region-specific functional status measures on patients with cervical spine disorders. *Phys Ther*. 1998;78:951-963.
- Robinson D, Halperin N, Agar G, Alk D, Rami K. Shoulder girdle neoplasms mimicking frozen shoulder syndrome. *J Shoulder Elbow Surg*. 2003;12:451-455. <http://dx.doi.org/10.1016/S1058274603000922>.
- Rosenfeld M, Seferiadis A, Carlsson J, Gunnarsson R. Active intervention in patients with whiplash-associated disorders improves long-term prognosis: a randomized controlled clinical trial. *Spine*. 2003;28:2491-2498. <http://dx.doi.org/10.1097/01.brs.0000090822.96814.13>
- Rosenfeld M, Seferiadis A, Gunnarsson R. Active involvement and intervention in patients exposed to whiplash trauma in automobile crashes reduces costs: a randomized, controlled clinical trial and health economic evaluation. *Spine*. 2006;31(16):1799-1804.
- Russell EJ, D'Angelo CM, Zimmerman RD. Cervical disk herniation: CT demonstration after contrast enhancement. *Radiology*. 1984;152(3):703-712.
- Ryan GA, Taylor GW, Moore VM, Dolinis J. Neck strain in car occupants: injury status after 6 months and crash-related factors. *Injury*. 1994;25(8):533-537.
- Saal JS, Saal JA, Yurth EF. Nonoperative management of herniated cervical intervertebral disc with radiculopathy. *Spine*. 1996;21:1877-1833.
- Sampath P, Bendebba M, Davis JD, Ducker T. Outcome in patients with cervical radiculopathy. Prospective, multicenter study with independent clinical review. *Spine*. Mar15 1999;24(6):591-597.

Sarig-Bahat H. Evidence of exercise therapy in mechanical neck disorders. *Man Ther.* 2003;8:10-20.

Savolainen A, Ahlberg J, Nummila H, Nissinen M. Active or passive treatment for neck-shoulder pain in occupational health care? A randomized controlled trial. *Occup Med (Lond)*. 2004;54:422-424. <http://dx.doi.org/10.1093/occmed/kqh070>

Savolainen S, Rinne J, Hernesniemi J. A prospective randomized study of anterior single-level cervical disc operations with long-term follow-up: surgical fusion is unnecessary. *Neurosurgery*. Jul 1998;43(1):51-55.

Senstad O, Leboeuf-Yde C, Borchgrevink C. Frequency and characteristics of side effects of spinal manipulative therapy. *Spine*. 1997;22:435-440.

Shah KC, Rajshekhar V. Reliability of diagnosis of soft cervical disc prolapse using Spurling's test. *Br J Neurosurg*. Oct 2004;18(5):480-483.

Sherman, K.J., Cherkin, D.C., Hawkes, R.J., Miglioretti, D.L., Deyo, R.A. Randomized trial of therapeutic massage for chronic neck pain. *Clinical Journal of Pain*. 2009;25 (3): 233-238.

Shiffman RN, Dixon J, Brandt C, Essaihi A, Hsiao A, Michel G, et al. The GuideLine Implementability Appraisal (GLIA): Development of an instrument to identify obstacles to guideline implementation. *BMC Med Inform Decis Mak* 2005, 5:23.

Short J, McDonald S, Turner T, Martis R. Improving capacity for evidence-based practice in South East Asia: evaluating the role of research fellowships in the SEA-ORCHID Project. *BMC Med Educ* 2010; 10:37.

Sieben JM, Vlaeyen JW, Portegijs PJ, et al. A longitudinal study on the predictive validity of the fear-avoidance model in low back pain. *Pain*. 2005;117:162-170. <http://dx.doi.org/10.1016/j.pain.2005.06.002>.

Silbert PL, Mokri B, Schievink WI. Headache and neck pain in spontaneous internal carotid and vertebral artery dissections. *Neurology*. 1995;45:1517-1522.

Slipman CW, Plataras CT, Palmitier RA, Huston CW, Sterenfeld EB. Symptom provocation of fluoroscopically guided cervical nerve root stimulation. Are dynatomal maps identical to dermatomal maps? *Spine (Phila Pa 1976)*. Oct 15 1998;23(20):2235-2242.

Snyder H, Robinson K, Shah D, Brennan R, Handigran M. Signs and symptoms of patients with brain tumors presenting to the emergency department. *J Emerg Med*. 1993;11:253-258.

Soderlund A, Lindberg P. Cognitive behavioural components in physiotherapy management of chronic whiplash associated disorders (WAD)--a randomised group study. *Physiother Theory Pract*. 2001;17(4):229-238.

- Soderlund A, Lindberg P. Whiplash-associated disorders--predicting disability from a process-oriented perspective of coping. *Clin Rehabil.* 2003;17(1):101-107.
- Spengler DM, Kirsh MM, Kaufer H. Orthopaedic aspects and early diagnosis of superior sulcus tumor of lung (Pancoast). *J Bone Joint Surg AM.* 1973;55:1645-1650.
- Spitzer WO, Skovron ML, Salmi LR, Cassidy JD, Duranceau J, Suissa S, et al. Scientific Monograph of the Quebec Task Force on Whiplash-Associated Disorders, Redefining Whiplash and its Management. *Spine.* 1995;20(8 Suppl):1S-73S.
- Sterling M, Jull G, Kenardy J. Physical and psychological factors maintain long-term predictive capacity post whip-lash injury. *Pain.* 2006;122:102-108. <http://dx.doi.org/10.1016/j.pain.2006.01.014>
- Sterling M, Jull G, Vicenzino B, Kenardy J, Darnell R. Physical and psychological factors predict outcome following whiplash injury. *Pain.* 2005;114(1-2):141-148.
- Sterling M, Jull G, Vicenzino B, Kenardy J. Sensory hypersensitivity occurs soon after whiplash injury and is associated with poor recovery. *Pain.* 2003;104:509-517.
- Stewart MJ, Maher CG, Refshauge KM, Herbert RD, Bogduk N, Nicholas M. Randomized controlled trial of exercise for chronic whiplash-associated disorders. *Pain.* 2007;128(1-2):59-68.
- Stiell IG, Wells GA, Vandemheen KL, et al. The Canadian C-spine rule for radiography in alert and stable trauma patients. *JAMA.* 2001;286:1841-1848.
- Stratford PW, Gill C, Westway MD, Binkley JM. Assessing disability and change on individual patients: a report of a patient-specific measure. *Physiother Can.* 1995;47:258.
- Stratford PW, Riddle DL, Binkley JM, Spadoni G, Westaway MD, Padfield B. Using the neck disability index to make decisions concerning individual patients. *Physiother Can.* 1999;51:107-112.
- Taimela S, Takala EP, Asklof T, Seppala K, Parviainen S. Active treatment of chronic neck pain: a prospective randomized intervention. *Spine.* 2000;25:1021-1027.
- Tamura T. Cranial symptoms after cervical injury. Aetiology and treatment of the Barre-Lieou syndrome. *J Bone Jt Surg.* 1989; 71B:283-287.
- Thuile C, Walzl M. Evaluation of electromagnetic fields in the treatment of pain in patients with lumbar radiculopathy or the whiplash syndrome. *Neuro Rehabilitation.* 2002;17(1):63-67.
- Tong HC, Haig AJ, Yamakawa K. The Spurling test and cervical radiculopathy. *Spine (Phila Pa 1976).* Jan 15 2002;27(2):156-159.

TRACsa: Trauma and Injury Recovery. Clinical guidelines for best practice management of acute and chronic whiplash-associated disorders - Evidence Report. Adelaide, SA: TRACsa; 2008.

Tseng YL, Wang WT, Chen WY, Hou TJ, Chen TC, Lieu FK. Predictors for the immediate responders to the cervical manipulation in patients with neck pain. *Man Ther.* 2006;11:306-315. <http://dx.doi.org/10.1016/j.math.2005.08.009>.

Turner T, Misso M, Harris C, Green S. Development of evidence-based clinical practice guidelines (CPGs): Comparing approaches. *Implement Sci* 2008; 3:45.

Van de Kelft E, van Vyve M. Diagnostic imaging algorithm for cervical soft disc herniation. *J Neurol Neurosurg Psychiatry.* Jun 1994;57(6):724-728.

Van Saase JL, van Romunde Lk, Cats A, Vandenbroucke JP, Valkenburg HA. Epidemiology of osteoarthritis: Zoetermeer survey. Comparison of radiological osteoarthritis in a Dutch population with that in 10 other populations. *Ann Rheum Dis.* 1989;48:271-280.

Vassiliou T, Kaluza G, Putzke C, Wulf H, Schnabel M. Physical therapy and active exercises--an adequate treatment for prevention of late whiplash syndrome? Randomized controlled trial in 200 patients. *Pain.* 2006;124(1-2):69-76.

Vernon H, Humphreys BK, Hagino C. The outcome of control groups in clinical trials of conservative treatments for chronic mechanical neck pain: a systematic review. *BMC Musculoskelet Disord.* 2006;7:58. <http://dx.doi.org/10.1186/1471-2474-7-58>

Vernon H, Mior S. The Neck Disability Index: a study of reliability and validity. *J Manipulative Physiol Ther.* 1991;14:409-415.

Voyvodic F, Dolinis J, Moore VM, et al. MRI of car occupants with whiplash injury. *Neuroradiology.* 1997;39:35-40.

Wainner RS, Fritz JM, Irrgang JJ, Boninger ML, Delitto A, Allison S. Reliability and diagnostic accuracy of the clinical examination and patient self-report measures for cervical radiculopathy. *Spine (Phila Pa 1976).* Jan 1 2003;28(1):52-62.

Waldrop MA. Diagnosis and treatment of cervical radiculopathy using a clinical prediction rule and a multimodal intervention approach: a case series. *J Orthop Sports Phys Ther.* 2006;36:152-159. <http://dx.doi.org/10.2519/jospt.2006.2056>

Wenzel HG, Haug TT, Mykletun A, Dahl AA. A population study of anxiety and depression among persons who report whiplash traumas. *J Psychosom Res.* 2002;53:831-835.

Westway MD, Startford PW, Binkley JM. The patient-specific functional scale: validation of its use in persons with neck dysfunction. *J Orthop Sports Phys Ther.* 1998;27:331-338.

Wilson DW, Pezzuti RT, Place JN. Magnetic resonance imaging in the preoperative evaluation of cervical radiculopathy. *Neurosurgery*. Feb 1991;28(2):175-179.

Wirth FP, Dowd GC, Sanders HF, Wirth C. Cervical discectomy. A prospective analysis of three operative techniques. *Surgical Neurol*. 2000:340-346; discussion 346-348.

Xie JC, Hurlbert RJ. Discectomy versus discectomy with fusion versus discectomy with fusion and instrumentation: a prospective randomized study. *Neurosurgery*. Jul 2007;61(1):107-116; discussion 116-107.

Yap EC. Myofascial pain-an overview. *Ann Acad Med Singapore*. 2007 Jan;36(1):43-8.

Ylinen J, Hakkinen A, Nykanen M, Kautiainen H, Takala EP. Neck muscle training in the treatment of chronic neck pain: a three-year follow-up study. *Eura medicophys*. 2007;43:161-169.

Ylinen J, Takala EP, Nykanen M, et al. Active neck muscle training in the treatment of chronic pain in women: a randomized controlled trial. *JAMA*. 2003;289:2509-2516. <http://dx.doi.org/10.1001/jama.289.19.2509>

Yoss RE, Corbin KB, Maccarty CS, Love JG. Significance of symptoms and signs in localization of involved root in cervical disk protrusion. *Neurology*. Oct 1957;7(10):673-683.

Zito G, Jull G, Story I. Clinical tests of musculoskeletal dysfunction in the diagnosis of cervicogenic headache. *Man Ther*. 2006;11:118-129. <http://dx.doi.org/10.1016/j.math.2005.04.007>