Non-pharmacological management of persistent headaches associated with neck pain

A clinical practice guideline from the Ontario protocol for traffic injury management (OPTIMa) collaboration

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Non-pharmacological Management of Persistent Headaches Associated with Neck Pain:
A Clinical Practice Guideline from the Ontario Protocol for Traffic Injury Management
(OPTIMA) Collaboration

Running title: Management of Headaches Associated with Neck Pain

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Conflicts of Interest:

Dr. Côté reports grants from Ontario Ministry of Finance and Financial Services Commission of Ontario during the conduct of this study. Dr. Côté reports grants from Ontario Trillium Foundation, Skoll Foundation, Aviva Canada, NCMIC Foundation, ELIB and Mitacs outside the submitted work. Dr. Côté reports funding from Canada Research Chair Program - Canadian Institutes of Health Research during the conduct of this study; personal fees from National Judicial Institute, Société des experts en évaluation médico-légale du Québec, and European Spine Society, outside the submitted work. Dr. Mior reports research grants from the Ontario Chiropractic Association and Canadian Chiropractic Association. Dr. Ammendolia reports funding from the Canadian Chiropractic Research Foundation and The Arthritis Society. Dr. Ammendolia is on the speaking bureau for NCMIC.

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Significance:

- Neck pain and headaches are very common comorbidities in the population
- Tension-type and cervicogenic headaches can be treated effectively with specific exercises
- Manual therapy can be considered as an adjunct therapy to exercise to treat patients with cervicogenic headaches.
- The management of tension-type and cervicogenic headaches should be patient-centered

Key words: clinical practice guideline; headache; treatment; management; practice guideline; therapies; therapy; disease management; neck pain

ABSTRACT

Objectives: To develop an evidence-based guideline for the non-pharmacological management of persistent headaches associated with neck pain (i.e., tension-type or cervicogenic).

Methods: This guideline is based on systematic reviews of high-quality studies. A multidisciplinary expert panel considered the evidence of clinical benefits, cost-effectiveness, societal and ethical values, and patient experiences when formulating recommendations.

Target audience includes clinicians; target population is adults with persistent headaches associated with neck pain.
Results: When managing patients with headaches associated with neck pain, clinicians should: 1) rule out major structural or other pathologies, or migraine as the cause of headaches; 2) classify headaches associated with neck pain as tension-type headache or cervicogenic headache once other sources of headache pathology has been ruled out; 3) provide care in partnership with the patient and involve the patient in care planning and decision-making; 4) provide care in addition to structured patient education; 5) consider low load endurance craniocervical and cervicoscapular exercises for tension-type headaches (episodic or chronic) or cervicogenic headaches >3 months duration; 6) consider general exercise, multimodal care (spinal mobilization, craniocervical exercise, and postural correction), or clinical massage for chronic tension-type headaches; 7) do not offer manipulation of the cervical spine as the sole form of treatment for episodic or chronic tension-type headaches; 8) consider manual therapy (manipulation with or without mobilization) to the cervical and thoracic spine for cervicogenic headaches >3 months duration. However, there is no added benefit in combining spinal manipulation, spinal mobilization, and exercises; and 9) reassess the patient at every visit to assess outcomes and determine whether a referral is indicated.

Conclusions: Our evidence-based guideline provides recommendations for the conservative management of persistent headaches associated with neck pain. The impact of the guideline in clinical practice requires validation.
INTRODUCTION

Neck pain and headaches are common co-morbidities. In Canada, individuals with disabling neck pain are 10 times more likely to suffer from co-morbid headaches than those without neck pain (Côté et al., 2000). Moreover, more than 80% of individuals who experience headaches after a motor vehicle collision also experience neck pain (Cassidy et al., 2000).

In 2008, the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders recognized the link between neck pain and headaches (Guzman et al., 2008). The Task Force defined neck pain as an unpleasant and emotional experience in the cervical spine and proposed a classification that ranges from neck pain that is not associated with major structural pathology or interference with activities of daily living (Grade I) to neck pain caused by major structural pathology (Grade IV) (Guzman et al., 2008). Each grade of neck pain can be associated with headaches. However, the Task Force did not explicitly define the type of headaches that are associated with neck pain.

The International Classification of Headache Disorders (ICHD-3) suggests that two types of headaches are linked to the cervical spine: tension-type headaches and cervicogenic headaches (Headache Classification Subcommittee of the International Headache Society, 2018). Tension-type headache (frequent episodic or chronic) is defined as being typically bilateral, pressing or tightening in quality and of mild to moderate intensity, lasting minutes to days or unremitting on average for at least three months (Headache Classification Subcommittee of the International Headache Society, 2018). The pain does not worsen with routine physical activity and is not or may be associated with nausea, although photophobia or phonophobia may be present. It can be associated with pericranial tenderness on manual palpation of the head and neck muscles (Fernandez-de-Las-Penas et al., 2007; Fernandez-de-
Cervicogenic headaches are caused by a disorder of the cervical spine (bony, disc and/or soft tissue structures) and is usually accompanied by neck pain (Headache Classification Subcommittee of the International Headache Society, 2018; Sjaastad and Bakketeig, 2008; Sjaastad et al., 1998).

It is estimated that 2,331,334,700 of the world’s population experience tension-type headaches in 2017 (Global Burden of Disease 2017 Collaborators, 2018). Cervicogenic headaches are also common in the general population. In Denmark, the point prevalence of cervicogenic headaches is 2.5% in individuals between the ages of 20 and 59 and 17.8% of people who report at least five headache days per month suffer from cervicogenic headaches (Nilsson, 1995).

The clinical management of headaches associated with neck pain is often challenging. Evidence suggests that cervical spine exercises or manual therapy may be effective in the management of tension-type or cervicogenic headaches (Varatharajan et al., 2016). Moreover, available clinical practice guidelines recommend that reassurance, acupuncture, exercise, physical therapy (e.g., massage, spinal manipulation, hot and cold packs, ultrasound, electrical stimulation) and psychological interventions can be used to treat tension-type headaches (Becker et al., 2015; Bendtsen et al., 2010; Carville et al., 2012). Similarly, existing guidelines recommend that exercise, spinal manipulation and cervical mobilization can be considered for the treatment of cervicogenic headaches (Becker et al., 2015; Duncan et al., 2008). However, the four guidelines currently available need to be updated because their recommendations were informed by evidence published more than five years ago (Clark et al., 2006; Qaseem et al., 2010). Therefore, a high-quality evidence-based
METHODS

Scope and Purpose of the Guideline

We used the best available evidence to develop a clinical practice guideline for the non-pharmacological management of persistent headaches associated with neck pain. The target population is adults (18 years of age or older) with persistent (> 3 months duration) headaches associated with neck pain. These headaches include tension-type headache or cervicogenic headache (Table 1) (Headache Classification Subcommittee of the International Headache Society, 2018; Sjaastad and Bakketeig, 2008; Sjaastad et al., 1998; Varatharajan et al., 2016). Non-pharmacological interventions included acupuncture, exercise, manual therapy, multimodal care, passive physical modalities, soft tissue therapies, structured patient education, and work disability prevention interventions, excluding medications (interventions defined in Appendix I). The target audience is clinicians (medical doctors, physiotherapists, nurse practitioners, chiropractors, kinesiologists, psychologists, massage therapists, osteopaths, and naprapaths) who provide care for patients with headaches associated with neck pain in primary, secondary, and tertiary health care settings. The clinical management recommended in this guideline aims to: 1) accelerate recovery; 2) reduce the intensity of symptoms; 3) promote early restoration of function; 4) prevent chronic pain and disability; 5) improve health related quality of life; 6) reduce recurrences; and 7) promote active participation of patients in their care. Moreover, this guideline aims to promote uniform high-quality care for individuals with headaches associated with neck pain.
This guideline was developed by the Ontario Protocol for Traffic Injury Management (OPTIMa) Collaboration, which is a multidisciplinary team of expert clinicians (from medical, dental, physiotherapy, chiropractic, psychological, occupational therapy, and nursing disciplines), academics and scientists (epidemiologists, clinical epidemiologists, library sciences, and health economists), a patient liaison, a consumer advocate, a retired judge, and automobile insurance industry experts. The OPTIMa Collaboration was mandated by the funding organization to develop an evidence-based clinical practice guideline for headaches associated with neck pain.

**Systematic Reviews**

We updated the systematic reviews from the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders (Hurwitz et al., 2008). This update included six systematic reviews (published in one article) examining the effectiveness and safety of non-invasive interventions for the management of headaches associated with neck pain (Varatharajan et al., 2016). We also conducted one systematic review examining cost-effectiveness of the non-invasive interventions (data extraction completed but not published).

We registered the systematic reviews with the International Prospective Register of Systematic Reviews (PROSPERO; exercise: CRD42013004848, manual therapy: CRD42013004901, acupuncture: CRD42013004687, multimodal care: CRD42013006940) (National Institute for Health Research).

The systematic reviews included studies examining the effectiveness of non-pharmacological interventions for the management of persistent headaches associated with neck pain (Table 1; Appendix I) (Headache Classification Subcommittee of the International Headache Society, 2018; Sjaastad and Bakketeig, 2008; Sjaastad et al., 1998). We excluded studies of migraine.

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(with or without aura), traumatic brain injuries, and underlying pathological processes. Eligible comparators for non-pharmacological interventions included other interventions, placebo/sham interventions, non-intervention effects associated with wait listing, or no intervention. The clinical outcomes of interest included self-rated recovery, functional recovery, disability, pain intensity, health-related quality of life, psychological outcomes, or adverse events. Eligible study designs included randomized controlled trials (RCTs), cohort studies, and case-control studies published in English. Only full economic evaluations that jointly analyzed costs and health outcomes were eligible for inclusion in the cost-effectiveness review.

We searched MEDLINE, EMBASE, PsycINFO, and the Cochrane Central Register of Controlled Trials through Ovid Technologies, Inc., and CINAHL Plus with Full Text through EBSCOhost (Appendix IIA and IIB). We also searched EconLit through ProQuest, Health Technology Assessment (Cochrane), and National Health Service Economic Evaluation Database (Cochrane) for economic evaluations (Appendix IIA and IIB). Our searches included publication dates from January 1990 to February or March 2015 (search dates varied between reviews) for non-invasive interventions; and 2) to August 2013 for the cost-effectiveness of non-invasive interventions. We updated searches of the six systematic reviews from February or March 2015 (search dates varied between reviews) to February 25, 2017 in MEDLINE to identify any recently published RCTs. Random pairs of independent, trained reviewers screened and critically appraised eligible studies using the Scottish Intercollegiate Guidelines Network (SIGN) criteria (Harbour and Miller, 2001). Studies with low risk of bias were included in the evidence synthesis (Slavin, 1995). Low risk of bias studies were defined as studies where selection bias, information bias, and confounding were deemed unlikely by two independent reviewers to have threatened the internal validity of the
study. Minimal clinically important difference thresholds from the literature were used to
determine the clinical importance of the results between groups from low risk of bias studies
(Carroll et al., 2012; Farrar et al., 2001; Lauche et al., 2013; McCarthy et al., 2007; Sim et
al., 2006; Stauffer et al., 2011).

Development of Recommendations
The OPTIMa Collaboration developed the guideline using the principles of patient-centered
care and the Ontario Health Technology Advisory Committee framework (Johnson et al.,
2009). Specifically, we developed the evidence-based recommendations according to:

- Overall clinical benefits (i.e., effectiveness and safety of interventions based on our
  systematic reviews) (Varatharajan et al., 2016);
- Value for money (i.e., cost-effectiveness of interventions when available based on our
  systematic review);
- Consistency with expected societal and ethical values (including persons’ lived
  experiences with their treatment based on our qualitative research) (Lindsay et al.,
  2016).

The OPTIMa Collaboration included a chair, a project manager, a multidisciplinary
Guideline Expert Panel (including a consumer representative and a nurse/qualitative
researcher who represented patients’ views), a recommendation sub-committee, a technical
team, and consultants. The technical team conducted all systematic reviews; and the
Guideline Expert Panel reviewed and approved all the methodological merit, analysis and
interpretation of systematic reviews. In collaboration with the recommendation sub-
committee, the authors of each systematic review developed draft clinical recommendations.
The Guideline Expert Panel reviewed and modified draft recommendations, and approved final recommendations. When research evidence was sparse (e.g., red flags), the Guideline Expert Panel used evidence from three other headache guidelines to inform its recommendations (Carville et al., 2012; Duncan et al., 2008; Perry et al., 2017). The translation of scientific evidence into guideline recommendations followed five steps (Table 2A). Finally, the technical team integrated recommendations into care pathways and algorithms, which were approved by the Guideline Expert Panel (Figures 1-6).

This guideline adapted the National Institute for Health and Care Excellence methodology to develop the wording of guideline recommendations (Table 2B) (Vargas-Schaffer, 2010).

Based on this methodology, we worded recommendations as:

- **Offer** interventions that are of superior effectiveness compared to other interventions, placebo/sham interventions, or no intervention
- **Consider** interventions providing similar effectiveness to other interventions
- **Do not offer** interventions providing no benefit beyond placebo/sham or are harmful

Using the results from the systematic reviews, the Recommendation Subcommittee interpreted the evidence on the effectiveness and safety of interventions by determining whether an intervention was superior, equal or inferior to placebo/sham or a control intervention. An intervention was deemed to have superior effectiveness if evidence of statistically significant and clinically important benefits was identified in at least one RCT with a low risk of bias. Interventions for which there is inconclusive evidence of effectiveness were not recommended (Appendix III).
We reported the frequencies and durations of care for recommended interventions based on low risk of bias studies in our systematic reviews. Specifically, for recommended interventions based on one low risk of bias study, we used the frequency and duration of care in that study. For recommended interventions based on more than one low risk of bias study, we computed mean frequency and duration of a specific intervention across studies and recommended the frequency and duration of care (Côté and Soklaridis, 2011; Doshmangir et al., 2017).

External Consultation and Review of the Guideline

This evidence-based clinical practice guideline was developed for the Government of Ontario. The Government invited stakeholders to review and comment on the guideline. Moreover, the government held a series of public consultations on the clinical practice guideline from August 17-21, 2015. The Government will determine its applicability to the Ontario healthcare system. It is recommended that this guideline is updated in five years so that the guideline is based on current evidence (Kung et al., 2012). The update should use methodology similar to the development of this guideline.

UPDATE OF SYSTEMATIC REVIEWS

We updated the original search of the literature conducted for the original six systematic reviews (extending from February or March 2015 to February 25, 2017). This search yielded 417 articles (after duplicates removed), of which three RCTs were relevant, and all three had a low risk of bias (Appendix IV). The low risk of bias studies from the updated searches investigated the following interventions: (1) manual therapy (Dunning et al., 2016; Espi-
Lopez et al., 2016); (2) multimodal care (Dunning et al., 2016); (3) soft tissue therapies (Damapong et al., 2015). None of these studies provided evidence that conflicted with the original recommendations developed by the OPTIma Collaboration (i.e., based on original searches conducted in February or March 2015). We only identified one low risk of bias cost-effectiveness study (Witt et al., 2008).

RECOMMENDATIONS:

All recommended interventions are supported by evidence of effectiveness, safety and cost-effectiveness (when cost-effectiveness data were available), and are consistent with societal and ethical values. Interventions that are not recommended did not satisfy the criteria of one or more key decision determinants (i.e., evidence of effectiveness, safety, cost-effectiveness, and/or consistency with societal and ethical values).

Recommendation 1: Evaluation of Headaches Associated with Neck Pain

Clinicians should rule out major structural or other pathologies, or migraine as the cause of headaches. Clinicians should classify headaches as tension-type headache or cervicogenic headache.

Clinicians should conduct a clinical evaluation to rule out major structural or other pathologies (e.g., migraines with or without aura, traumatic brain injuries) as the cause of presenting signs and symptoms. The presence of risk factors for serious pathologies (also termed ‘red flags’) identified during the history/examination warrants further investigation.
and referral to the appropriate healthcare professional (Table 3) (Carville et al., 2012; Duncan et al., 2008; Perry et al., 2017). Once major pathology has been ruled out, clinicians should classify headaches as tension-type or cervicogenic headaches, and the patient should receive the appropriate evidence-based interventions (Figures 2, 4, 6, care pathways).

**Recommendation 2: Management of Persistent Headaches Associated with Neck Pain**

*Clinicians should provide care in partnership with the patient and involve the patient in care planning and decision-making.*

For headaches associated with neck pain, clinicians should provide care in partnership with the patient and involve the patient in care planning and decision-making (Stiggelbout et al., 2012). Clinicians should aim to understand the patient’s beliefs and expectations about headaches and address any misunderstandings or apprehension through education and reassurance. Clinicians need to advise patients to stay active or exercise, provide information about pain and its mechanism, reassure patients about the nature and course of headaches, and deliver time-limited care that includes effective interventions (Yu et al., 2016). In the presence of prognostic factors (e.g., psychosocial factors, demographics, headache characteristics) for delayed recovery, clinicians should discuss them with the patient and adjust their care plan accordingly (Probyn et al., 2017).
Recommendation 3: Management of Episodic Tension-Type Headaches (Tables 4A-4B, Figures 1-2)

For patients with episodic tension-type headaches, clinicians may consider low load endurance craniocervical and cervicoscapular exercises in addition to structured patient education. In view of evidence of no effectiveness, clinicians should not offer manipulation of the cervical spine.

Structured Patient Education: Clinicians should provide information about the nature, management, and course of episodic tension-type headaches as a framework for initiating the program of care. This recommendation is based on universal principles of health professions’ standards of practice wherein patients are informed and educated about their condition, and participate in the decision-making process (Stiggelbout et al., 2012).

Low load endurance craniocervical and cervicoscapular exercises: Clinicians may consider low load endurance craniocervical and cervicoscapular exercises (a maximum of 8 sessions over 6 weeks with resistance in a supervised clinical environment). This involves supervised and home-based low load endurance exercises to perform a slow and controlled craniocervical flexion against resistance over time to train muscular control of the craniocervical and cervicoscapular region. The exercise program should be taught to the patient by a healthcare professional. This recommendation is based on one low risk of bias RCT that found adding low-load endurance exercises (6 weeks supervised period, twice a day for 10 min per session at home, then at least twice per week after supervised period) to physiotherapy (i.e., Western massage, low-velocity passive cervical joint mobilization, instruction on postural correction) is superior to physiotherapy alone for improving headache.
frequency in the long-term for chronic or episodic tension-type headaches (van Ettekoven and Lucas, 2006).

Manual Therapy: Clinicians should not offer manipulation of the cervical spine. This recommendation is based on two low risk of bias RCTs suggesting that cervical manipulation combined with massage led to similar outcomes as inert LASER combined with massage (Bove and Nilsson, 1998) or massage alone (Espi-Lopez et al., 2016).

**Recommendation 4: Management of Chronic Tension-Type Headaches (recommendation Tables 4A-4B, Figures 3-4)**

For patients with chronic tension-type headaches, clinicians may consider general exercise (including warm-up, neck and shoulder stretching and strengthening, aerobic exercises), low load endurance craniocervical and cervicoscapular exercises, multimodal care (combining spinal mobilization, cranio cervical exercise, and postural correction), or clinical massage in addition to structured patient education. In view of evidence of no effectiveness, clinicians should not offer manipulation of the cervical spine as the sole form of treatment.

**Structured Patient Education**

As described above, clinicians should provide information about the nature, management, and course of chronic tension-type headaches as a framework for initiating the program of care.
**Exercise:** Clinicians may consider a general clinic- and home-based exercise program (warm-up, neck and shoulder stretching and strengthening, aerobic exercise) limited to a maximum of 25 sessions over 12 weeks. The exercise program should be taught and supervised by a healthcare professional. This recommendation is based on one low risk of bias RCT. The RCT by Soderberg et al. suggests that similar outcomes in headache intensity and quality of life post-intervention and at three months are obtained from either general exercise (25 sessions over 10-12 weeks), needle acupuncture, or combined relaxation training and stress coping therapy (Soderberg et al., 2006; Soderberg et al., 2011).

Clinicians may consider low load endurance craniocervical and cervicoscapular exercises (a maximum of 8 sessions over 6 weeks with resistance). This involves supervised and home-based low load endurance exercises against resistance over time to train muscular control of the craniocervical and cervicoscapular region. The exercise program should be taught to the patient by a healthcare professional. This recommendation is based on one low risk of bias RCT that found adding low-load endurance exercises (6 weeks supervised period, twice a day for 10 min per session at home, then at least twice per week after supervised period) to physiotherapy (Western massage, low-velocity passive cervical joint mobilization, instruction on postural correction) is superior to physiotherapy alone for improving headache frequency in the long-term for chronic or episodic tension-type headaches (van Ettekoven and Lucas, 2006).

**Multimodal Care:** Clinicians may offer a maximum of nine sessions over eight weeks of multimodal care that includes spinal mobilization, craniocervical exercises, and postural correction. This multimodal care program should be provided to the patient by a healthcare professional.
professional. This recommendation is based on one low risk of bias RCT that found a multimodal care program (cervical and thoracic mobilization, craniocervical exercise, and postural correction) (30 min per session for a maximum of 9 sessions) is more effective than usual general practitioner (GP) care in reducing symptom intensity related to chronic tension-type headache (Castien et al., 2011).

*Soft-tissue Therapy:* Clinicians may consider eight 45-minute sessions of clinical massage (2 sessions per week over 4 weeks). This recommendation is based on one low risk of bias RCT suggesting that court-type traditional Thai massage (a form of clinical massage) (45 minutes per session, 2 sessions per week over 4 weeks) and amitriptyline may lead to similar outcomes (Damapong et al., 2015).

*Manual Therapy:* Clinicians should not offer cervical spine manipulation. This recommendation is based on one low risk of bias RCT suggesting that cervical manipulation combined with massage led to similar outcomes as massage alone (Espi-Lopez et al., 2016).

**Recommendation 5: Management of Persistent Cervicogenic Headaches (Tables 4A-4B, Figures 5 and 6)**

For patients with cervicogenic headaches >3 months duration, clinicians may consider low load endurance craniocervical and cervicoscapular exercises or manual therapy (manipulation with or without mobilization) to the cervical and thoracic spine in addition to structured patient education. However, there is no added benefit in combining spinal manipulation, spinal mobilization, and exercises.

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**Structured Patient Education:** As described above, clinicians should provide information about the nature, management, and course of persistent cervicogenic headaches as a framework for initiating the program of care.

**Exercise:** Clinicians may consider low load endurance craniocervical and cervicoscapular exercise with resistance limited to a maximum of eight sessions over six weeks. This involves supervised and home-based low load endurance exercises against resistance over time to train muscular control of the craniocervical and cervicoscapular region. The exercise program should be taught to the patient by a healthcare professional. This recommendation is based on one low risk of bias RCT suggesting that low load endurance craniocervical and cervicoscapular exercise (8–12 visits over 6 weeks) is more effective than no intervention in improving headache-related outcomes and neck symptoms for the management of chronic cervicogenic headaches (Jull et al., 2002).

**Manual therapy:** Clinicians may consider manual therapy (manipulation with or without mobilization) to the cervical and thoracic spine limited to a maximum of 10 sessions over six weeks. This recommendation is based on three low risk of bias RCTs suggesting that: 1) spinal manipulation combined with light massage and moist heat (8 or 16 treatments over 8 weeks) are more effective than light massage and moist heat alone in improving headache pain, headache frequency, and headache-induced disability (Haas et al., 2010a; Haas et al., 2010b); 2) spinal manipulation and mobilization (8–12 visits over 6 weeks) are more effective than no intervention in improving headache-related outcomes and neck symptoms (Jull et al., 2002); and 3) spinal manipulation (6-8 sessions over 4 weeks) is more effective than multimodal care (spinal mobilization and craniocervical flexion exercise) (Dunning et al., 2016).
**Multimodal care:** Clinicians should not offer a multimodal program of care that includes a combination of exercise, spinal manipulation, and spinal mobilization. This recommendation is based on two low risk of bias RCTs suggesting that: 1) combining low-load endurance exercises with spinal manipulation and mobilization is not more clinically beneficial than providing either intervention alone (Jull *et al.*, 2002); and 2) combining craniocervical flexion exercise and spinal mobilization is less effective than spinal manipulation (Dunning *et al.*, 2016).

**Recommendation 6: Reevaluation and Discharge**

Clinicians should reassess the patient at every visit to determine if: 1) additional care is necessary; 2) the condition is worsening; or 3) the patient has recovered. Patients should be discharged as soon as they report significant recovery. Health care professionals should use the self-rated recovery question to measure recovery: “How well do you feel you are recovering from your injuries?” (Carroll *et al.*, 2016; Fischer *et al.*, 1999). The response options include: 1) completely better, 2) much improved, 3) slightly improved, 4) no change, 5) slightly worse, 6) much worse, 7) worse than ever. Patients reporting to be ‘completely better’ or ‘much improved’ should be considered recovered. The self-rated recovery question is a valid and reliable global measure of recovery in patients with headaches (Carroll *et al.*, 2016; Fischer *et al.*, 1999). Patients who have not recovered should follow the care pathway outlined in the guideline (Figures 2, 4, 6).
DISCUSSION

We developed an evidence-based clinical practice guideline to help clinicians deliver effective interventions for the management of persistent headaches associated with neck pain. The recommendations aim to promote uniform high-quality care based on recent systematic reviews of the literature and synthesis of best available evidence. Implementing the evidence-based recommendations for headaches associated with neck pain will likely improve patient outcomes, reduce regional variations, and improve the efficiency of the healthcare system (Anis et al., 1995; Nichol et al., 1999; Rutten et al., 2010).

Our guideline identifies clinical interventions that should not be prescribed because their effectiveness is not established. The Guideline Expert Panel did not recommend these interventions to minimize the risk of iatrogenic disability in patients with neck pain (Cassidy et al., 2007; Côté and Soklaridis, 2011; Côté et al., 2005). We found inconclusive evidence on the effectiveness of needle acupuncture for the management of tension-type headaches because the results of multiple high-quality RCTs conflicted with each other (Varatharajan et al., 2016). The guideline does not recommend passive physical modalities, stand-alone structured patient education, or work disability prevention interventions because their effectiveness has not been evaluated in high-quality studies (Varatharajan et al., 2016).

Furthermore, multimodal care is a program of care that includes a combination of individual interventions (e.g., exercise, soft tissue therapy). Our guideline evaluated the effectiveness of both multimodal and individual interventions based on available evidence. Therefore, one individual intervention can be recommended as part of multimodal care but is recommended against as a stand-alone intervention (and vice versa).
Summary of Recommendations

Clinicians should rule out major structural or other pathologies as the cause of headaches. In the absence of major structural or other pathologies, clinicians should classify headaches associated with neck pain as tension-type or cervicogenic headaches. In the context of shared decision-making, clinicians should discuss with the patient the range of effective interventions available for the management of headaches associated with neck pain. In the presence of prognostic factors for delayed recovery, clinicians should discuss them with the patient and adjust their care plan accordingly.

The following clinical interventions can be considered for episodic tension-type headaches: low load endurance craniocervical and cervicospinal exercises. For chronic tension-type headaches, clinicians can consider general exercise (warm-up, neck and shoulder stretching and strengthening, aerobic exercises), low load endurance craniocervical and cervicospinal exercises, multimodal care (spinal mobilization, craniocervical exercise, and postural correction) or clinical massage. For persistent cervicogenic headaches, clinicians can consider low load endurance craniocervical and cervicospinal exercises, or manual therapy (manipulation with or without mobilization) to the cervical and thoracic spine. It is important to note that all recommended interventions provide small benefits at best.

Comparison to Previous Guidelines

There are existing clinical practice guidelines to assist the management of persistent headaches associated with neck pain (Becker et al., 2015; Bendtsen et al., 2010; Carville et al., 2012; Duncan et al., 2008). Overall, our recommendations agree with those of previous
clinical practice guidelines (Becker et al., 2015; Bendtsen et al., 2010; Duncan et al., 2008).

For the management of tension-type headaches, patient education and reassurance, exercise and massage are recommended (Becker et al., 2015; Bendtsen et al., 2010); and cervical spine manipulation is not recommended (Bendtsen et al., 2010). Exercise and manual therapy (manipulation and mobilization) are recommended for the management of cervicogenic headaches (Becker et al., 2015; Duncan et al., 2008).

There are a few important differences between previous guidelines and ours. Specifically, we do not recommend or refute acupuncture for the management of tension-type headaches, and do not recommend multimodal care (low load endurance exercises, spinal manipulation, and spinal mobilization) for the management of persistent cervicogenic headaches. These differences are likely because the previous guidelines included studies with a high risk of bias and small sample sizes, and need updating (Carlsson et al., 1990a; Carlsson et al., 1990b; Karst et al., 2001; Kassak et al., 1995; Mousavi et al., 2011). Our recent systematic review found inconclusive evidence on the effectiveness of needle acupuncture for the management of tension-type headaches (Endres et al., 2007; Jena et al., 2008; Melchart et al., 2005; Varatharajan et al., 2016). Moreover, our recent systematic review identified two high-quality studies which found that combining exercise and spinal mobilization with or without spinal manipulation was not clinically more beneficial than providing either intervention alone for persistent cervicogenic headaches (Dunning et al., 2016; Jull et al., 2002; Varatharajan et al., 2016).
The publication of recent high quality RCTs allows for a meaningful update of previously published clinical practice guidelines and will improve the ability of clinicians to manage patients with headaches associated with neck pain. The literature searches for the previously published guidelines ended in 2009, 2011 and 2012 (Becker et al., 2015; Bendtsen et al., 2010; Carville et al., 2012; Duncan et al., 2008). Our guideline includes five new high-quality studies (Castien et al., 2011; Damapong et al., 2015; Dunning et al., 2016; Espi-Lopez et al., 2016; Haas et al., 2010a; Haas et al., 2010b). One new study enabled us to develop evidence-based recommendations on the use of manual therapies and multimodal care (i.e., cervical and thoracic mobilization, craniocervical exercise, and postural correction) for the management of tension-type headaches (Castien et al., 2011). Two new RCTs add evidence that clinical massage is effective (Damapong et al., 2015) and that cervical manipulation is not effective for the management of tension-type headaches (Espi-Lopez et al., 2016). Moreover, recent high-quality evidence strengthens the recommendation that spinal manipulation is effective in reducing pain intensity and disability in patients with persistent cervicogenic headaches (Dunning et al., 2016; Haas et al., 2010a; Haas et al., 2010b). Finally, the OPTIMa guideline improves previous clinical practice guidelines by recommending optimal dosage of interventions (frequency and durations of care).

**Dissemination and Implementation of this Guideline**

This guideline could be adapted for local use in other jurisdictions. We recommend that clinicians, insurers, and policy-makers use the ADAPTE framework to adapt this guideline to their needs and environment (ADAPTE Collaboration (2009), 2010).
Strengths and Limitations

This clinical practice guideline is based on comprehensive literature searches and its recommendations were developed from high-quality evidence. When developing clinical recommendations, the Guideline Expert Panel considered effectiveness, safety, cost-effectiveness, and consistency with societal and ethical values. Moreover, the lived experiences of patients with their care was used when developing recommendations (Lindsay et al., 2016). Our recommendations also included consideration of effect sizes; minimal clinically important differences were used to assess the magnitude of benefit of an intervention on patient outcomes. Finally, the Guideline Expert Panel disclosed any conflicts of interest and maintained editorial independence.

Our recommendations were limited by the amount and quality of published evidence (Varatharajan et al., 2016). Specifically, we found no high-quality studies that investigated the effectiveness of passive physical modalities, stand-alone structured patient education, and work disability prevention interventions (Varatharajan et al., 2016). We found little evidence to support the cost-effectiveness of non-pharmacological interventions for the management of headaches associated with neck pain. Similarly, evidence is lacking to determine whether recommended interventions are more effective than placebo or sham treatments. Future research should prioritize these two areas of investigation.

Acknowledgments: The authors would like to acknowledge the invaluable contributions to this guideline from Lynn Anderson, Carol Cancelliere, Poonam Cardoso, Brenda Gamble, Willie Handler, Viivi Riis, Paula Stern, Thepikaa Varatharajan, Angela Verven, and Leslie Verville.
Author Contributions

All authors have made substantial contributions to all of the following: (1) substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; (2) drafting the article or revising it critically for important intellectual content; and (3) final approval of the version to be submitted. All authors discussed the results and commented on the manuscript.

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Figure Legends

Figure 1. Quick Reference Guide for the Management of Episodic Tension-type Headaches (4-6 months)

Figure 2. Care Pathway for the Management of Episodic Tension-type Headaches (4-6 months)

Figure 3. Quick Reference Guide for the Management of Chronic Tension-type Headaches (4-6 months)

Figure 4. Care Pathway for the Management of Chronic Tension-type Headaches (4-6 months)

Figure 5. Quick Reference Guide for the Management of Cervicogenic Headaches (4-6 months)

Figure 6. Care Pathway for the Management of Cervicogenic Headaches (4-6 months)
Table 1: Definition of tension-type headaches and cervicogenic headaches according to the International Classification of Headache Disorders (ICHD-3) Third Edition (Headache Classification Subcommittee of the International Headache Society, 2018) and Sjaastad et al. (1998 & 2008) (Sjaastad and Bakketeig, 2008; Sjaastad et al., 1998).

<table>
<thead>
<tr>
<th>Headache Type</th>
<th>Classification Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tension-Type</td>
<td>ICHD Criteria:</td>
</tr>
<tr>
<td></td>
<td>Tension-type headaches can be classified as: 1) frequent episodic tension-type headache with or without pericranial tenderness; or 2) chronic tension-type headache with or without pericranial tenderness. The presence of pericranial tenderness is indicated by increased tenderness on manual palpation of head and neck muscles, which include, but may not be limited to the following: frontal, temporal, masseter, pterygoid, sternocleidomastoid, splenius and trapezius muscles.</td>
</tr>
</tbody>
</table>

i. Diagnostic criteria for frequent episodic tension-type headache associated with or without pericranial tenderness:
   a. At least 10 episodes occurring on 1-14 days per month for > 3 months (≥12 and <180 days per year) and fulfilling criteria B-D
   b. Lasting from 30 minutes to 7 days
   c. At least two of the following four characteristics:
      i. bilateral location
      ii. pressing or tightening (non-pulsating) quality
      iii. mild or moderate intensity
      iv. not aggravated by routine physical activity such as walking or climbing stairs
   d. Both of the following:
      i. no nausea or vomiting
      ii. no more than one of photophobia or phonophobia
   e. Not better accounted for by another ICHD-3 diagnosis

ii. Diagnostic criteria for chronic tension-type headache associated with or without pericranial tenderness:
   a. Headache occurring on ≥15 days per month on average for >3 months (≥180 days per year) and fulfilling criteria B-D
   b. Lasting hours to days, or unremitting
   c. At least two of the following four characteristics:
      i. bilateral location
      ii. pressing or tightening (non-pulsating) quality
      iii. mild or moderate intensity
      iv. not aggravated by routine physical activity such as walking or climbing stairs
   d. Both of the following:
      i. no more than one of photophobia, phonophobia or mild nausea

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<table>
<thead>
<tr>
<th>Headache Type</th>
<th>Classification Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>i. neither moderate or severe nausea nor vomiting</td>
</tr>
<tr>
<td></td>
<td>e. Not better accounted for by another ICHD-3 diagnosis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cervicogenic</th>
<th>ICHD Criteria:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>i. Diagnostic criteria for cervicogenic headache:</td>
</tr>
<tr>
<td></td>
<td>a. Any headache fulfilling criterion C</td>
</tr>
<tr>
<td></td>
<td>b. Clinical and/or imaging evidence of a disorder or lesion within the cervical spine or soft tissues of the neck, known to be able to cause headache</td>
</tr>
<tr>
<td></td>
<td>c. Evidence of causation demonstrated by at least two of the following:</td>
</tr>
<tr>
<td></td>
<td>i. headache has developed in temporal relation to the onset of the cervical disorder or appearance of the lesion</td>
</tr>
<tr>
<td></td>
<td>ii. headache has significantly improved or resolved in parallel with improvement in or resolution of the cervical disorder or lesion</td>
</tr>
<tr>
<td></td>
<td>iii. cervical range of motion is reduced and headache is made significantly worse by provocative manoeuvres</td>
</tr>
<tr>
<td></td>
<td>iv. headache is abolished following diagnostic blockade of a cervical structure or its nerve supply</td>
</tr>
<tr>
<td></td>
<td>d. Not better accounted for by another ICHD-3 diagnosis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sjaastad et al. (1998) Criteria</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Diagnostic criteria for cervicogenic headache, adapted from Sjaastad et al. (1998). The major criteria of cervicogenic headache are:</td>
<td></td>
</tr>
<tr>
<td>a. Symptoms and signs of neck involvement:</td>
<td></td>
</tr>
<tr>
<td>i. precipitation of head pain, similar to the usually occurring one:</td>
<td></td>
</tr>
<tr>
<td>ii. by neck movement and/or sustained awkward head positioning, and/or:</td>
<td></td>
</tr>
<tr>
<td>iii. by external pressure over the upper cervical or occipital region on the symptomatic side</td>
<td></td>
</tr>
<tr>
<td>iv. restriction of the range of motion (ROM) in the neck</td>
<td></td>
</tr>
<tr>
<td>v. ipsilateral neck, shoulder, or arm pain of a rather vague nonradicular nature or, occasionally, arm pain of a radicular nature.</td>
<td></td>
</tr>
<tr>
<td>b. Confirmatory evidence by diagnostic anesthetic blockades. <em>Point (B) is an obligatory point in scientific works.</em></td>
<td></td>
</tr>
<tr>
<td>c. Unilaterality of the head pain, without sideshift. <em>For scientific work, point (C) should preferably be adhered to.</em></td>
<td></td>
</tr>
<tr>
<td>d. Head Pain Characteristics:</td>
<td></td>
</tr>
<tr>
<td>i. moderate-severe, nonthrobbling, and nonlancinating pain, usually starting in the neck</td>
<td></td>
</tr>
<tr>
<td>ii. episodes of varying duration, or</td>
<td></td>
</tr>
<tr>
<td>iii. fluctuating, continuous pain</td>
<td></td>
</tr>
</tbody>
</table>

*It is required that one or more of the characteristics under point (A) are present. If point (1) is satisfied then a positive diagnoses can be made; if point (1) is not satisfied, then points (2) and (3) need to be satisfied.*
<table>
<thead>
<tr>
<th>Headache Type</th>
<th>Classification Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sjaastad et al. (2008) Criteria: A quantitative diagnostic system (I–VI) enabling comparison between groups and subgroups:</td>
</tr>
<tr>
<td></td>
<td>(I) Unilaterality/unilateral preponderance of pain. Non-symptomatic side co-involvement during intense headache was allowed.</td>
</tr>
<tr>
<td></td>
<td>(II) Reduction, range of motion (ROM) in the neck (S). Movements in all directions were tested; only rotation reduction will be reported. Positivity indicates ≥10° deficit, on at least one side.</td>
</tr>
<tr>
<td></td>
<td>(III/IV) Pain/discomfort in the ipsilateral shoulder (III) and arm (IV), either of a radicular or of a more vague nature. (V) Precipitation of attacks/exacerbations from sensitive spots in the neck, i.e. groove behind the mastoid processor tendon insertions in the occiput (S).</td>
</tr>
<tr>
<td></td>
<td>(VI) Precipitation of attacks/exacerbations by awkward positions of the neck.</td>
</tr>
</tbody>
</table>
**Table 2A. Guideline Recommendations: Translation of Scientific Evidence into Guideline Recommendations by the Ontario Protocol for Traffic Injury Management (OPTIMa) Collaboration**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description of Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Draft recommendations based on the best-evidence synthesis of the literature were developed by the authors of each systematic review.</td>
</tr>
<tr>
<td>2</td>
<td>The recommendation sub-committee used the key decision determinants of the Ontario Health Technology Advisory Committee framework (Johnson et al., 2009) to modify the draft recommendation, evaluating its consistency with patients’ experiences and preferences, expected societal and ethical values and incorporating economic evidence.</td>
</tr>
<tr>
<td>3</td>
<td>The recommendation subcommittee reviewed the draft recommendation, debated its validity and, if necessary, made modifications based upon the scientific evidence.</td>
</tr>
<tr>
<td>4</td>
<td>The recommendation subcommittee reached consensus on the draft recommendation.</td>
</tr>
<tr>
<td>5</td>
<td>Draft recommendations (with supporting decision determinants) were presented to the Guideline Expert Panel at quarterly meetings. The Guideline Expert Panel provided feedback and voted to accept, reject, or modify each recommendation. Recommendations requiring modification were reformulated and a new, separate vote for the revised recommendation occurred. Voting was done through secret ballot. Consensus was reached when 75% of the Guideline Expert Panel accepted a recommendation.</td>
</tr>
</tbody>
</table>

*aThe recommendation subcommittee included individuals representing rehabilitation medicine, nursing, chiropractic, epidemiology, health economics, and patient liaison.*
Table 2B. Guideline Recommendations: Wording of Guideline Recommendations as adapted from the National Institute for Health and Care Excellence Methodology (Vargas-Schaffer, 2010)\(^a\)

<table>
<thead>
<tr>
<th>Effectiveness of Interventions</th>
<th>Wording of Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interventions that should be used are interventions demonstrated to be clearly superior to other interventions, placebo/sham interventions, or no intervention (i.e., statistically significant and clinical important between group differences favouring the intervention)</td>
<td>Recommendations start with the word “offer”</td>
</tr>
<tr>
<td>Interventions that should not be offered because they provide no benefit beyond placebo/sham (i.e., statistically significant and clinical important between group differences favouring placebo/sham) or because they are harmful (i.e. serious adverse events or high frequency of minor adverse events)</td>
<td>Recommendations start with the words “do not offer”</td>
</tr>
<tr>
<td>Recommendations for interventions providing similar effectiveness to other interventions (between group differences of the interventions were not statistically significant and/or clinically important)</td>
<td>Recommendations start with the word “consider”; the choice of interventions should be influenced by patients’ values and preferences.</td>
</tr>
<tr>
<td>Evidence was deemed inconclusive when the results of multiple low risk of bias studies conflicted</td>
<td>Intervention was categorized under ‘inconclusive evidence’: conflicting results prevented the development of a coherent statement of effectiveness</td>
</tr>
</tbody>
</table>

\(^a\)The Guideline Expert Panel was confident that the treatment will do more good than harm for the ‘offer’ or ‘consider’ interventions, and that the treatment will not benefit patients for ‘do not offer’ interventions.
Table 3. Risk Factors of Serious Pathology (Red Flags) for Headaches

<table>
<thead>
<tr>
<th>Risk factors of serious pathology identified during history or physical examination$^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Worsening headache with fever</td>
</tr>
<tr>
<td>• Sudden-onset headache (thunderclap) reaching maximum intensity within 5 minutes</td>
</tr>
<tr>
<td>• New-onset neurological deficit</td>
</tr>
<tr>
<td>• New-onset cognitive dysfunction</td>
</tr>
<tr>
<td>• Change in personality</td>
</tr>
<tr>
<td>• Impaired level of consciousness</td>
</tr>
<tr>
<td>• Recent (typically within the past 3 months) head trauma</td>
</tr>
<tr>
<td>• Headache triggered by exertion (e.g., cough, valsalva maneuver (trying to breathe out with nose and mouth blocked), sneeze, or exercise)</td>
</tr>
<tr>
<td>• Headache that changes with posture</td>
</tr>
<tr>
<td>• Symptoms suggestive of giant cell arteritis</td>
</tr>
<tr>
<td>• Symptoms and signs of acute narrow-angle glaucoma</td>
</tr>
<tr>
<td>• A substantial change in the characteristics of a patient’s headache</td>
</tr>
<tr>
<td>• New onset or change in headache in patients who are over 40 years old</td>
</tr>
<tr>
<td>• Headache waking the patient up</td>
</tr>
<tr>
<td>• Patients with risk factors for cerebral venous sinus thrombosis</td>
</tr>
<tr>
<td>• Jaw claudication or visual disturbance</td>
</tr>
<tr>
<td>• Neck pain or stiffness</td>
</tr>
<tr>
<td>• Limited neck flexion upon exam</td>
</tr>
<tr>
<td>• New onset headache in patients with a history of human immunodeficiency virus (HIV) infection</td>
</tr>
<tr>
<td>• New onset headache in patients with a history of cancer</td>
</tr>
</tbody>
</table>

$^a$This list of risk factors of serious pathology was informed from the following peer reviewed clinical practice guidelines rather than being developed from a systematic review of the literature on "red flags" (Carville et al., 2012; Duncan et al., 2008; Perry et al., 2017)
### Table 4A. Treatment Recommendations for Headaches Associated with Neck Pain

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
<th>Episodic Tension-type Headaches</th>
<th>Chronic Tension-type Headaches</th>
<th>Cervicogenic Headaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide information about the nature, management, and course of headaches associated with neck pain as a framework for the initiation of the program of care</td>
<td>4-6 months</td>
<td>4-6 months</td>
<td>4-6 months</td>
</tr>
<tr>
<td>Consider a maximum of 8 sessions over 6 weeks of low load endurance craniocervical and cervicocapsular exercises, with resistance</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Consider a maximum of 25 sessions over 12 weeks of general exercise (warm-up, neck and shoulder stretching and strengthening, aerobic exercise)</td>
<td>○</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Offer a maximum of 9 sessions over 8 weeks of multimodal care that includes spinal mobilization, craniocervical exercises, and postural correction</td>
<td>○</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Consider a maximum of 8 sessions (45 minutes per session) over 4 weeks of clinical massage (shoulders, upper back, connecting area of neck and shoulders, shoulder tips, the back of head, the middle line of head, face)</td>
<td>○</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Consider a maximum of 10 sessions over 6 weeks of manual therapy (manipulation with or without mobilization) to the cervical and thoracic spine</td>
<td>○</td>
<td>○</td>
<td>●</td>
</tr>
</tbody>
</table>

- ● Recommended interventions to be considered for the specified duration/type of headaches associated with neck pain
- ○ There is no recommendation for this intervention with respect to the specified duration/type of headaches associated with neck pain
Table 4B. Treatment Interventions that Should Not Be Offered for Headaches Associated with Neck Pain

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
<th>Episodic Tension-type Headaches</th>
<th>Chronic Tension-type Headaches</th>
<th>Cervicogenic Headaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO NOT OFFER</td>
<td>4-6 months</td>
<td>4-6 months</td>
<td>4-6 months</td>
</tr>
<tr>
<td>Manipulation of the cervical spine</td>
<td>●</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>A multimodal program of care that combines spinal manipulation, spinal mobilization, and low load endurance exercises</td>
<td>○</td>
<td>○</td>
<td>●</td>
</tr>
</tbody>
</table>

● Interventions that should not be offered for the specified duration/type of headaches associated with neck pain

○ There is no ‘do not offer’ recommendation for this intervention with respect to the specified duration/type of headache associated with neck pain
Quick Reference Guide – Management of Episodic Tension-type Headaches

Symptoms ≥ 3 months post-injury

For all persons with episodic tension-type headaches, after ruling out risk factors of serious pathologies:
Offer information on return, management, course of episodic tension-type headaches as a framework for initiation of a program of care
Conduct ongoing assessment for symptom improvement or worsening/progress during intervention and refer accordingly
Reasses and Monitor the presence of acute stress disorder, post-traumatic stress disorder, kinesiophobia, passive coping, depression, anxiety, anger, frustration and fear
Discharge as appropriate at any point during intervention and recovery

Consider the following therapeutic option, if not previously done, based on shared decision making between patient and provider:

Home and clinic-based interventions:
1. Low load endurance cranio cervical and cervicoocapular exercises

Do not offer:
• Manipulation of the cervical spine

Outcome:
Recovered → Discharge
Unrecovered/incomplete recovery or major symptom change (new or worsening physical, mental or psychological symptoms) → Refer to physician

* Risk factors for serious pathologies (also known as red flags): worsening headache with fever; sudden-onset headache (thunderclap) reaching maximum intensity within 5 minutes; new-onset neurological deficit; new-onset cognitive dysfunction; change in personality; impaired level of consciousness; recent (typically within the past 3 months) head trauma; headache triggered by exertion (e.g., cough, Valsalva maneuver [trying to breathe out with nose and mouth blocked], sneeze, or exercise); headache that changes with posture: symptoms suggestive of giant cell arteritis; symptoms and signs of acute narrow-angled glaucoma; a substantial change in the characteristics of the patient’s headache; new onset or change in headache in patients who are aged over 40; headache waking the patient up (migraine is the most frequent cause of morning headache); patients with risk factors for cerebral venous sinus thrombosis (jaw claudication or visual disturbance; neck pain or stiffness; limited neck flexion upon exam); new onset headache in patients with a history of human immunodeficiency virus (HIV) infection; new onset headache in patients with a history of cancer

* This guideline does not include interventions for which there is a lack of evidence of effectiveness

* Based on evidence of no benefit to patients
Care Pathway for the Management of Episodic Tension-type Headaches

Persons with episodic tension-type headaches

Conduct an appropriate clinical examination

Risk factors for serious pathologies?

Yes

Refer to physician

No

Offer information on nature, management, course of episodic tension-type headaches as a framework for initiation of appropriate care

Is treatment required?

Yes

Discharge

No

A. Consider the following therapeutic options based upon shared decision making between patients and providers:

Home and self-based interventions:
1. Low-intensity aerobic and cardiovascular exercises

B. Do not offer:
1. Manipulation of the cervical spine

Is the person in recovery?

Yes

Discharge

No

1. Incomplete recovery: refer to physician
2. Major symptom change (new condition): proceed to appropriate flowchart or refer to physician

Risk factors for serious pathologies (also known as red flags): worsening headache with fever; sudden-onset headache (thunderclap) reaching maximum intensity within 1 minute; new-onset neurological deficit; new-onset cognitive dysfunction; change in personality; impaired level of consciousness; recent history of head trauma; headache triggered by exertion (e.g., cough, valsalva maneuver); trying to breathe out with nose and mouth blocked; nausea; or vomiting; headache that changes with posture; symptoms suggestive of placental abruption; symptomatic and signs of acute normotensive glaucoma; substantial change in the characteristics of the patient's headache; new onset or change in headaches in patients who are aged over 50 years; headache worsening the patient up to 50% of the most frequent cause of morning headache; patients with risk factors for cerebral venous sinus thrombosis; pyrexia; or peripheral edema; diabetes or diabetes mellitus; limited vision upon onset; new onset headache in patients with a history of human immunodeficiency virus (HIV) infection; new onset headache in patients with a history of cancer

This guideline does not include interventions for which there is a lack of evidence of effectiveness

Based on evidence of no benefit to patients

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# Quick Reference Guide – Management of Chronic Tension-type Headaches

## Symptoms ≥ 3 months post-injury

For all persons with chronic tension-type headaches, after ruling out risk factors of serious pathologies:

- Offer information on nature, management, course of episodic tension-type headaches as a framework for initiation of a program of care
- Conduct ongoing assessment for symptom improvement or worsening/progress during intervention and refer accordingly
- Reassess and Monitor the presence of acute stress disorder, post-traumatic stress disorder, kinesiophobia, passive coping, depression, anxiety, anger, frustration and fear
- Discharge as appropriate at any point during intervention and recovery

Consider the following therapeutic options, if not previously done, based upon shared decision making between patient and provider:

### Home and clinic-based interventions:

1. General exercise (warm-up, neck and shoulder stretching and strengthening, aerobic exercises);
2. Low load endurance cranioocervical and cervicoaxial exercises;
3. Multimodal care that includes spinal mobilization, cranioocervical exercises, and postural correction; or
4. Clinical massage on shoulders, upper back, connecting area of neck and shoulders, should tips, the back of head, the middle line of head, face

### Do not offer:

- Manipulation of the cervical spine

### Outcome:

<table>
<thead>
<tr>
<th>Recovered</th>
<th>Discharge</th>
<th>Refer to physician</th>
</tr>
</thead>
</table>

* Risk factors for serious pathologies (also known as red flags): worsening headache with fever; sudden-onset headache (thunderclap) reaching maximum intensity within 5 minutes; new-onset neurologic deficit; new-onset cognitive dysfunction; change in personality; impaired level of consciousness; recent (typically within the past 3 months) head trauma; headache triggered by exertion (e.g., cough, valsalva maneuver) trying to breathe out with nose and mouth blocked; sneeze, or exercise); headache that changes with posture; symptoms suggestive of giant cell arteritis; symptoms and signs of acute narrow-angle glaucoma; a substantial change in the characteristics of the patient’s headache; new onset or change in headache in patients who are aged over 40; headache waxing the patient up (migraine is the most frequent cause of morning headache); patients with risk factors for cerebral venous sinus thrombosis; jaw claudication or visual disturbance; neck pain or stiffness; limited neck flexion upon exam; new onset headache in patients with a history of human immunodeficiency virus (HIV) infection; new onset headache in patients with a history of cancer

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* The ordering of interventions does not reflect superiority of effectiveness

* Based on evidence of no benefit to patients

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Care Pathway for the Management of Chronic Tension-type Headaches

1. Persons with chronic tension-type headaches

2. Conduct an appropriate clinical evaluation

3. Risk factors for serious pathologies?
   - Yes: Refer to physician
   - No: Offer information on nature, management, causes of chronic tension-type headaches as a framework for initiation of a program of care

4. Is treatment required?
   - Yes: Continue
   - No: Discharge

5. A. Consider the following therapeutic options based on a shared decision making between patient and provider:
   1. Home and clinical-based interventions:
      - General exercise (warm-up, neck and shoulder stretching and strengthening, aerobic exercises)
      - Low-impact endurance cranio-cervical and cervicospinal exercises
      - Multitasking care that includes spinal mobilization, cranio-cervical exercises, and postural correction
      - Clinical massage on shoulders, upper back, connecting area of neck and shoulders, shoulder tip, the back of head, the middle line of head, face
   2. Do not offer:
      - 1. Manipulation of the cervical spine

6. Is the person concerned?
   - Yes: Discharge
   - No: Incomplete recovery refer to physician

7. 1. Major symptom change (new condition), proceed to appropriate management or refer to physician

* Risk factors for serious pathologies (also known as red flags): worsening headaches with fever; sudden onset headache (thunderclap) reaching maximum intensity within 5 minutes; new-onset neurological deficit; new-onset cognitive dysfunction; change in personality; impaired level of consciousness; recent (typically within the past 3 months) head trauma; headache triggered by exertion (e.g., cough, valsalva maneuver); trying to breathe out with nose and mouth blocked; stress, or exercise); headache that changes with posture; symptoms suggestive of partial or total symptoms and signs of acute normosugary glucose; a substantial change in the characteristics of the patient is noted; new onset or change in headache in patients who are age 50 or older; headache waking the patient up (in spasm is the most frequent cause of morning headaches); patient with risk factors for cerebrovascular thrombosis; jaw dysfunction; or visual disturbance; neck or pain stiffness; limited neck flexion upon exam; new onset headache in patients with a history of human immunodeficiency virus (HIV) infection; new onset headache in patients with history of cancer.

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‡ Based on evidence of no benefit to patients.
# Quick Reference Guide – Management of Cervicogenic Headaches

### Symptoms ≥ 3 months post-injury

- For all persons with cervicogenic headaches, after ruling out risk factors of serious pathologies:
  - Offer information on nature, management, course of episodic tension-type headaches as a framework for initiation of a program of care
  - Conduct ongoing assessment for symptom improvement or worsening/progress during intervention and refer accordingly
  - Reassess and Monitor the presence of acute stress disorder, post-traumatic stress disorder, kinesiophobia, passive coping, depression, anxiety, anger, frustration and fear
  - Discharge as appropriate at any point during intervention and recovery

Consider the following therapeutic options, if not previously done, based upon shared decision making between patient and provider:

### Home and clinic-based interventions:

1. Low load endurance cranio cervical and cervicospinal exercises; or
2. Manual therapy (manipulation with or without mobilization) to the cervical and thoracic spine

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### Do not offer:

- Multimodal program of care that combines spinal manipulation, spinal mobilization, and low load endurance exercises

### Outcome:

<table>
<thead>
<tr>
<th>Recovered</th>
<th>Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrecovered/incomplete recovery or major symptom change (new condition or worsening physical, mental or psychological symptoms)</td>
<td>Refer to physician</td>
</tr>
</tbody>
</table>

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* Risk factors for serious pathologies (also known as red flags): worsening headache with fever; sudden-onset headache (thunderclap) reaching maximum intensity within 5 minutes; new-onset neurological deficit; new-onset cognitive dysfunction; change in personality; impaired level of consciousness; recent (typically within the past 3 months) head trauma; headache triggered by exertion (e.g., cough, Valsalva maneuver (trying to breathe out with nose and mouth blocked) sneeze or exercise); headache that changes with posture; symptoms suggestive of giant cell arteritis; symptoms and signs of acute narrow-angle glaucoma; a substantial change in the characteristics of the patient's headache; new onset or change in headache in patients who are aged over 40; headache wakening the patient up (migraine is the most frequent cause of morning headache); patients with risk factors for cerebral venous sinus thrombosis; jaw claudication or visual disturbance; neck pain or stiffness; limited neck flexion upon exam; new onset headache in patients with a history of human immunodeficiency virus (HIV) infection; new onset headache in patients with a history of cancer

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Care Pathway for the Management of Cervicogenic Headaches

1. Conduct an appropriate clinical evaluation

2. Risk factors for serious pathologies
   - Yes: Refer to physician
   - No: Offer information on nature, management, course of cervicogenic headaches as a transient for initiation of a program of care

3. Is treatment required?
   - Yes: Discharge
   - No: Consider the following therapeutic options based upon a shared decision making between patient and provider:

A. Acute and chronic-based interventions:
   1. Low-dose oral anti-inflammatory or nonsteroidal anti-inflammatory drugs
   2. Manual therapy (manipulation with or without mobilization) to the cervical and thoracic spine

B. Do not offer:
   3. Multimodal program of care that combines spinal manipulation, spinal mobilization, and low back endurance exercises

4. Is the patient recovered?
   - Yes: Discharge
   - No: Incomplete recovery: refer to physician

(1) Incomplete recovery: refer to physician
(2) Major symptom change (new condition): proceed to appropriate flowchart or refer to physician

* Risk factors for serious pathologies (also known as red flags): worsening headache with fever; sudden onset headache (thunderclap) lasting maximum intensity within 5 minutes; new onset neurological deficit; new onset cognitive dysfunction; change in personality; impaired level of consciousness; recent history of prowling, head injury, head injury triggered by exertion or cough; unilateral cranial nerve palsy; history of sleep apnea; headache that changes with posture; headache syndrome suggestive of giant cell arteritis; symptoms of acute normovolemic hemodilution syndrome

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