The Mulligan Concept of manual therapy

textbook of techniques

Wayne Hing
Toby Hall
Darren Rivett
Bill Vicenzino
Brian Mulligan

Sample proofs © Elsevier Australia
The Mulligan Concept of manual therapy
The Mulligan Concept of manual therapy  
textbook of techniques  

Wayne Hing   Toby Hall   Darren Rivett   Bill Vicenzino   Brian Mulligan
Contents

Foreword vi
Preface viii
About the authors x
Contributors xi
Reviewers xii
Acknowledgments xiii
Abbreviations for use in Mulligan Concept annotations xiv
Mulligan concept annotations xv

Introduction 1
Chapter 1 Cervicogenic headache 15
Chapter 2 Cervicogenic dizziness 35
Chapter 3 Cervical spine 55
Chapter 4 Temporomandibular joint 91
Chapter 5 Shoulder complex 107
Chapter 6 Elbow region 141
Chapter 7 Wrist and hand 189
Chapter 8 Thoracic spine and rib cage 243
Chapter 9 Sacroiliac joint 275
Chapter 10 Lumbar spine 307
Chapter 11 Hip region 349
Chapter 12 Knee 375
Chapter 13 Ankle and foot 417
Chapter 14 Pain release phenomenon 471

Picture credits 489
Index 000
In 2011, I had the privilege to write a foreword for a new textbook on my concepts authored by Bill Vicenzino, Wayne Hing, Darren Rivett and Toby Hall. This was a timely, excellent publication entitled *Mobilisation With Movement: The Art and the Science*.

My own manual on my concepts, now in its 6th edition, badly needed to be updated to include more detail and an improved format. This task has been undertaken and led by Wayne Hing, with all the above authors again being involved. It has taken over two years to complete this task. These erudite authors also had the wisdom to involve many of my Mulligan Concept international teachers. They have contributed by writing much of the text, each being allocated different regions of the body and different techniques. I must here particularly acknowledge and thank my colleagues Mark Oliver and Frank Gargano for the new techniques and material they have contributed.

I believe that the contents in this book, in its new format, are priceless. All who deal with musculoskeletal conditions and practise manual therapy should have a copy.

What makes our concepts so special is that all the Mobilisation With Movement techniques described within this book are only to be used when they produce no pain on application and because they should be immediately effective if indicated. I know of no other manual therapy procedures for the entire body, which follow these guidelines. What is really special about them is that it only takes about two minutes to decide if they are indicated. Not to be able to use our concepts may be denying patients their best treatment option. I now have many hours of video showing the efficacy of our concepts, personally treating patients on stage in many cities in America before my peers. The hundreds who have witnessed these occasions are left in no doubt as to the efficacy of these techniques because of the regular positive and instant pain-free outcomes.

Our concepts have come a long way from 1985 when, by chance, I had an unexpected instant pain-free success with a traumatised finger using what are now known as ‘Mobilisations With Movement’. The patient, who was a young woman in her early twenties, presented with a swollen interphalangeal joint which was painful and would not flex. I tractioned the joint several times which accomplished nothing. I then applied joint (glide) translations in the recommended biomechanically appropriate direction for flexion. Like the traction, these glides were also ineffective and painful. I then tried a medial translation accessory movement which was unacceptable to the patient because of pain. Without much enthusiasm I then gently tried a lateral translation which prompted the patient to say ‘it does not hurt’. Something prompted me to sustain this translation and ask her if she could flex her finger. To my astonishment and her delight the finger flexed without pain! She then said something like ‘You have fixed me’. ‘Of course!,’ I replied. She still had a small loss of flexion range due to some residual swelling but she departed my rooms with a smile.

The young woman returned two days later and her finger had completely recovered. Why, I asked myself? The only explanation I could come up with for my chance success was that as a result of her trauma there was a minute positional fault of the joint preventing flexion movement. When this positional fault was corrected it enabled a full recovery to take place. It was a simple hypothesis and because of this I began to look differently at all joints that I treated and experimented to see if I could achieve similar results by repositioning other joint surfaces. I began having unbelievable successes in the clinic. A ‘miracle a day’ I called them. Louis Pasteur once said that chance only favours the prepared mind. When I, by chance, had my first miracle with the young woman and her painfully limited interphalangeal joint, I did indeed have a prepared mind.
Today the concepts that have grown from this chance finding have come a long way and guidelines are now in place for their successful clinical use; these are fully described within this textbook. To optimally succeed with our concepts, you need advanced clinical reasoning and excellent handling skills. The detailed descriptions in this book will help you immensely in both these aspects. Ideally of course, the reader should attend the courses that are available around the world by accredited Mulligan Concept teachers. Teachers and courses are listed at www.bmulligan.com

While on the topic of teachers, I always acknowledge and thank my mentor Freddy Kaltenborn. Freddy came many times from Europe to teach in faraway New Zealand. He taught me how to manipulate every joint in the spine and to mobilise the extremity joints. His able teachings gave me excellent handling skills. He also increased my knowledge and the importance he placed on the clinical significance of treatment planes led me to successfully develop Mobilisations With Movement. If you do not know each joint’s treatment plane you will never be able to successfully manipulate or effectively apply the Mulligan concepts.

I must stress that the techniques contained with this book are not set in stone. They are all based on repositioning joint surfaces, or muscles and their tendons, to see if one can achieve pain-free resolution of a musculoskeletal problem. The techniques described in the book are those we in the Mulligan Concept Teachers Association have clinically found to be effective. If any clinicians applying them, who have the requisite knowledge and handling skills, can improve upon these techniques then this would be most welcome. It is hoped they would share their significant worthwhile improvements with other clinicians and teachers.

I feel very humble to have the support of such scholars as Wayne, Toby, Bill and Darren, and thank them and Elsevier sincerely for this wonderful publication.

Brian Mulligan
This book entitled The Mulligan Concept of manual therapy: textbook of techniques presents over 160 Mulligan Concept techniques and includes therapist techniques as well as home exercises and taping techniques. The book is aimed at being a comprehensive and easy to follow resource for the novice and experienced clinician, as well as researchers. The book has been written for the clinician, teacher and student interested in furthering their familiarity to the wide array of techniques under the Mulligan Concept umbrella. Mulligan Concept techniques are effective and safe when applied in accordance with easy to follow guidelines and clearly identified underlying principles.

When Brian Mulligan first described Mobilisation with Movements (MWM) in 1984 he shared his techniques through his original book entitled Manual Therapy: Nags, SNAGs and MWMs of which there have been six editions over the past 30 years. This book has been written to expand on and fully describe in a standardised format all the techniques mentioned in Brian Mulligan’s aforementioned original texts, as well as include new techniques that were not included in those earlier landmark editions. This book is also intended as an accompaniment to our first book entitled Mobilisation with Movement: the art and the science which was published in 2011.

Our first book presented the science underpinning MWM and also described aspects of ‘the art’ inherent in its successful implementation. In that book the basic principles of MWMs were outlined, potential mechanisms underpinning the successful application of MWMs were canvassed, and in depth aspects of its clinical application were critiqued including guidelines on dosage and troubleshooting. Over half of the first text presented the application of MWM in a series of case reports. These case studies focused on the clinical reasoning underlying the application of the Mulligan Concept, including consideration of the evidence base. The case studies followed the application of the Mulligan concept from the first session to discharge, showing how the techniques were selected, applied and progressed over the treatment program. However, the purpose of that first book was not to provide a detailed description of all the techniques under the Mulligan Concept umbrella, which is the scope of this current book as it continues the work of the preceding landmark Mulligan’s Manual Therapy: NAGS, SNAGS and MWMs book.

There was a real need for a comprehensive presentation of the wide array of techniques under the umbrella of the ‘Mulligan Concept’. These techniques include MWM and other Mulligan techniques such as pain release phenomenon (PRP). Each technique has been described in a consistent and logical format fully explaining the indications, application and modifications for each technique. In addition, we have detailed the current available evidence for each technique and provided Clinical Reasoning Gems, the aim of which is to illustrate pertinent information regarding clinical reasoning relating to techniques presented in each chapter.

The book is divided into 14 regional chapters, covering the whole body, and encompassing the whole range of musculoskeletal disorders that present to clinical practice, including apparent non-joint disorders such as lateral epicondylalgia. The first chapters focus on MWM, exercise and taping techniques for the upper quadrant that include the cervical spine through to the thorax. These chapters include cervicogenic headache and cervicogenic dizziness, the temporomandibular joint, shoulder complex, elbow, forearm, wrist and hand. The subsequent chapters cover the lower quadrant, including the lumbar spine, sacroiliac
joint, hip, knee, ankle and foot. The final chapter covers commonly used PRPs, which are distinct to MWM, but can be very helpful in the right clinical presentation, usually after the condition being treated have proven resistant to other Mulligan Concept techniques.

The techniques in this text are drawn from those presented on the Mulligan concept courses taught worldwide and as such form the curriculum of the different levels of those Mulligan Concept courses. Also presented is a dictionary of annotations for the techniques described, along with an explanation of the rationale underlying the system of annotations.

Professor Wayne Hing
Auckland, New Zealand, 2014
Adjunct Associate Professor Toby Hall
Perth, Australia, 2014
Professor Bill Vicenzino
Brisbane, Australia, 2014
Professor Darren A. Rivett
Newcastle, Australia, 2014
About the authors

Wayne Hing, PhD
Professor, Bond University, QLD, Australia

Toby Hall, PhD, MSc, Post Grad Dip Manip Ther
Adjunct Associate Professor, School of Physiotherapy and Curtin Health Innovation Research, Curtin University, Perth, WA, Australia
Snr Teaching Fellow, The University of Western Australia, Perth, WA, Australia
Fellow of the Australian College of Physiotherapists

Darren A Rivett, BAppSc(Phty), GradDipManipTher, MAppSc(ManipPhty), PhD, MAICD, APAM, MMCTA(Hon)
Professor of Physiotherapy and Head of the School of Health Sciences, The University of Newcastle, Australia; Board Director, Australian Physiotherapy Association

Brian Mulligan, FNZSP (Hon.) Dip MT
Lecturer, Author, President MCTA

Bill Vicenzino, PhD, MSc, Grad Dip Sports Phty, BPhty
Chair in Sports Physiotherapy, University of Queensland: School of Health and Rehabilitation Sciences: Physiotherapy, QLD, Australia
<table>
<thead>
<tr>
<th>Start position</th>
<th>Side</th>
<th>Joints/Anatomy</th>
<th>Glides (text)</th>
<th>Mulligan technique</th>
<th>Movement</th>
<th>Repetitions/Time/Sets</th>
</tr>
</thead>
<tbody>
<tr>
<td>pr ly = prone lying</td>
<td>L = left</td>
<td>ACJ = acromioclavicular joint</td>
<td>AP = anteroposterior#</td>
<td>BLR = bent leg raise</td>
<td>Ab = abductionφ</td>
<td>sec = seconds</td>
</tr>
<tr>
<td>sit = sitting</td>
<td>R = right</td>
<td>Ank = ankle</td>
<td>Ant = anterior</td>
<td>HA SNAG = headache</td>
<td>Ad = adductionφ</td>
<td>min = minutes</td>
</tr>
<tr>
<td>st = standing</td>
<td></td>
<td>Calc = calcaneum</td>
<td>Comp = compressionφ</td>
<td>sustained natural</td>
<td>Dev = deviation</td>
<td>x = times</td>
</tr>
<tr>
<td>sup ly = supine lying</td>
<td></td>
<td>CV = costovertebral joint</td>
<td>Dist = distraction</td>
<td>apophyseal glide</td>
<td>DF = dorsiflexionφ</td>
<td>() = sets</td>
</tr>
<tr>
<td>WB = weight bearing</td>
<td></td>
<td>Cx = cervical spine</td>
<td>gl = glide</td>
<td>MWM = Mobilisation with</td>
<td>DFIS = dorsiflexion in</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>C3 = cervical spine 3rd</td>
<td>Inf = inferior</td>
<td>Movement</td>
<td>standing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>vertebral</td>
<td>Lat = lateralφ</td>
<td>NAG = natural apophyseal</td>
<td>EIL = extension in</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elb = elbow</td>
<td>Med = medialφ</td>
<td>glide</td>
<td>lyingφ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fib = fibula</td>
<td>PA = posteroanterior*</td>
<td>Rev NAG = reverse natural</td>
<td>El = elevationφ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fra = forearm</td>
<td>Post = posterior</td>
<td>apophyseal glide</td>
<td>ER = external</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gastroc = gastrocnemius</td>
<td>Prox = proximal</td>
<td>Rev HA SNAG = reverse</td>
<td>rotation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GH = glenohumeral</td>
<td>Sup = superior</td>
<td>headache sustained</td>
<td>Ev = eversionφ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kn = knee</td>
<td></td>
<td>natural apophyseal glide</td>
<td>E = extensionφ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inn = innominate</td>
<td></td>
<td>SMWAM = spinal</td>
<td>F = flexionφ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LS = lumbar spine 5th</td>
<td></td>
<td>mobilisation with arm</td>
<td>HBB = hand behind</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>vertebra</td>
<td></td>
<td>movement</td>
<td>back</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MC = metacarpal</td>
<td></td>
<td>SMWLM = spinal</td>
<td>HF = horizontal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MCP = metacarpophalangeal</td>
<td></td>
<td>mobilisation with leg</td>
<td>flexionφ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>joint</td>
<td></td>
<td>movement</td>
<td>HC = horizontal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MF = metatarsal</td>
<td></td>
<td>SNAG = sustained natural</td>
<td>extensionφ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MTP = metatarsophalangeal</td>
<td></td>
<td>apophyseal glide</td>
<td>IR = internal rotation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>joint</td>
<td></td>
<td>Tr SRL = traction straight</td>
<td>Inv = inversionφ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PFJ = patellofemoral joint</td>
<td></td>
<td>leg raise</td>
<td>LF = lateral flexion</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PIP = proximal interphalangeal</td>
<td></td>
<td>Trans SNAG = transverse</td>
<td>Ocl = occlusion</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>joint</td>
<td></td>
<td>sustained natural</td>
<td>Opp = opposition</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PS = pubic symphysis</td>
<td></td>
<td>apophyseal glide</td>
<td>PF = plantarflexionφ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RUJ = radio-ulnar joint</td>
<td></td>
<td></td>
<td>Pron = pronation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SCJ = sternoclavicular joint</td>
<td></td>
<td></td>
<td>PKB = prone knee</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sh = shoulder</td>
<td></td>
<td></td>
<td>bend</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SJU = sacroiliac joint</td>
<td></td>
<td></td>
<td>Rct = rotation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sx = sacrum</td>
<td></td>
<td></td>
<td>SKB = small knee</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TMJ = temporomandibular joint</td>
<td></td>
<td></td>
<td>bend</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tx = thoracic spine</td>
<td></td>
<td></td>
<td>Supin = supination</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>T4 = thoracic spine 4th vertebra</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tib = tibia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wr = wrist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# Acceptable interchangeable terms for antero-posterior include dorsal and posterior
# Acceptable interchangeable terms for postero-anterior include anterior and ventral
# Denotes established Maitland abbreviations and symbols; whilst supination is recorded as 'Sup' in Maitland's abbreviations it has been altered here to avoid confusion with superior glide 'sup g' which is more commonly used than cephalad (ceph) and caudal (caud) in Mulligan Concept terminology.
# Denotes established McKenzie acronym
Cervicogenic headache

TECHNIQUES FOR CERVICOGENIC HEADACHES

Flexion-rotation test
C1/2 self-SNAG
Headache SNAG
Self-headache SNAG
Reverse headache SNAG
Self-reverse headache SNAG
Upper cervical traction
Self-upper cervical traction
INTRODUCTION

Headache is both a symptom and a disorder in its own right, hence classification of headache is important to ensure that correct treatment is administered (Dodick, 2010). The International Headache Society (IHS) has broadly classified headache as primary, where there is no other causative factor, or secondary where the headache occurs in close temporal relationship to another disorder to which it is attributed (Classification Committee of the International Headache Society, 2004). Cervicogenic headache (CGH) is one form of secondary headache, which arises from disorder of the cervical spine.

Current medical teaching indicates that each form of headache has a different pathological basis, the majority of which do not have a musculoskeletal cause (Dodick, 2010). Hence, it is critical that the individual presenting for treatment has their type of headache correctly identified. This is particularly important for manual therapist’s considering physical intervention for headache, where such intervention is unlikely to be effective for disorders other than those affecting the musculoskeletal system (Hall, 2011).

Mechanisms underlying CGH are those of convergence of afferent input from the upper three cervical segments with input from trigeminal afferents in the trigeminocervical nucleus (Bogduk & Govind, 2009). Hence input from sensory afferents in the cervical spine may be mistakenly perceived as pain in the head (Bogduk & Govind, 2009). Classification of headache disorders based on patient reported symptoms and history is problematic due to the overlap of features between CGH and migraine and other headache forms. Headache classification is therefore based on physical examination. The cervical flexion-rotation test (FRT) has been found to be a useful test to discriminate CGH from migraine or mixed headache forms (Hall, Briffa, Hopper & Robinson, 2010a). The positive cut-off point is 32–33º (Hall, Briffa, Hopper & Robinson, 2010b; Hall, Briffa & Hopper, 2010; Ogince, Hall, Robinson & Blackmore, 2007). An MRI study revealed that a positive test primarily indicates limitation of movement at the C1/2 level (Takasaki et al., 2010). The degree of limitation on this test has been shown to correlate with the severity, frequency, and duration of headache symptoms (Hall et al., 2010b), as well as being independent of other physiological and lifestyle factors (Smith, Hall & Robinson, 2007). Consequently the test has utility regardless of the age, gender or lifestyle of the person tested. Further study is required to identify the FRT’s sensitivity to change as an outcome measure.

In the presence of a positive FRT, a C1/2 self-SNAG can be applied as a treatment technique to attempt to restore normal range of motion and reduce symptoms. However, if a patient presents to the clinic experiencing a CGH at the time of consultation and has a positive FRT, then a trial of Headache SNAG, Reverse Headache SNAG, or upper cervical traction should be administered first. On subsequent visits, if symptoms are reduced but the FRT remains positive, then a C1/2 self-SNAG should be considered at that point.

The application of a self-SNAG to people with chronic CGH and a positive FRT was shown to be superior to a placebo treatment in a randomised clinical trial (Hall et al., 2007). Hall et al. (2007) showed that when compared to the placebo the self-SNAG improved range recorded during the FRT by 10º (95% CI: 4.7 to 15.3º) immediately after application and that at 12 months the treated group were 22 (13 to 31) points superior on the headache severity index (baseline headache severity index approximately 54/100).
FLEXION-ROTATION TEST

TECHNIQUE AT A GLANCE

- Patient lays supine with shoulders level with the end of the plinth.
- Patient’s head is supported by the therapist’s abdomen.
- Therapist passively moves the patient’s neck into end-range flexion.
- The patient’s head is held in flexion and then passively rotated to the left and right and range recorded.
- See Figure 1.1.

Figure 1.1
Flexion-rotation test

INDICATION

Headache of possible cervical spine origin or upper cervical symptoms.

POSITIONING

<table>
<thead>
<tr>
<th>Patient:</th>
<th>Lying supine, shoulders level with the end of the couch.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated body part:</td>
<td>Relaxed end-range cervical spine and upper thoracic spine flexion.</td>
</tr>
<tr>
<td>Therapist:</td>
<td>Stand at the head of the patient facing their feet with the patient’s head supported on the therapist’s abdomen.</td>
</tr>
<tr>
<td>Hands/contact points:</td>
<td>The therapist maintains end-range cervical spine flexion with hand contact on each side of the mandible together with forward pressure applied through the therapist’s abdomen.</td>
</tr>
</tbody>
</table>
APPLICATION GUIDELINES

- End-range flexion is essential to apply the test.
- At end-range cervical spine flexion, the head is rotated to the left and right and range noted. Make sure the rotation of the head is as pure as possible and no lateral flexion is allowed.
- The end-point is either resistance or pain whichever comes first.
- Normal range is on average 44° to each side (Hall & Robinson, 2004).
- An estimation of loss of range more than 10° confirms a positive test (Hall & Robinson, 2004).
- When using a compass goniometer, the positive cut-off point is 32° with a mean positive predictive value of 86% (Ogince et al., 2007).
- The degree of limitation is correlated with the severity of the headache symptoms (Hall, Briffa & Hopper, 2010).
- Typically range is restricted towards the side of headache. However, in approximately 20% of cases the limitation may be to the opposite side of headache.
- Range may be limited to both sides.

COMMENTS

- Ensure that there is no axial compression force applied through the patient’s head/neck. Hold the head/neck forward, but don’t lean down on the head. The purpose of holding the neck in flexion is to constrain movement to only the C1/2 vertebral level. Failure to maintain the end-range flexed position may give a false-negative finding, as movement may occur at other cervical levels.
- Range of motion is much greater in children. In general there is on average 9° greater range to each side in children between the age of 6 and 12 (Budelmann, von Piekartz & Hall, 2014). However, the Flexion-rotation test (FRT) can still be used to identify asymmetry in those children who suffer from CGH (Budelmann, von Piekartz & Hall, 2013).
- In the presence of a sensitised neuromeningeal system, it is advisable to perform the FRT with the patient’s knees flexed to 90°.

Alternatives/Adjustments/Progression

The FRT may be performed in a seated position. However, the supine position is preferred because of the ease of measuring range of movement. As well, there will be less stress on the neuromeningeal system in a supine position.
**C1/2 SELF-SNAG**

**TECHNIQUE AT A GLANCE**

- Patient sits in a chair with their back supported.
- Patient places a self-SNAG strap on the posterior arch of C1, below the mastoid process on the contralateral side of restriction.
- With the hand on the side of the restriction, the patient pulls the strap horizontally forward to the corner of their mouth.
- While the strap pressure is sustained, the patient rotates the head/neck towards the restricted side.
- Apply over-pressure only if symptom-free at end-range.
- See Figure 1.2.

![Figure 1.2](image1)  
C1/2 self-SNAG  

![Figure 1.3](image2)  
C1/2 self-SNAG close-in shot

**INDICATION**

Headache, neck pain or restriction of C1/2 rotation, together with a unilateral or bilateral restriction on the FRT.

**POSITIONING** (see Figure 1.3)

<table>
<thead>
<tr>
<th><strong>Patient:</strong></th>
<th>Sitting with their back supported against a hard backed, upright chair.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treated body part:</strong></td>
<td>Relaxed neutral position of the head and neck. For a right rotation restriction, the patient holds one end of the self-SNAG strap with their right hand. The left elbow hooks over the back of the chair to stabilise the trunk and prevent trunk rotation. The left hand holds the opposite end of the strap loosely, with the left hand resting on the abdomen.</td>
</tr>
<tr>
<td><strong>Therapist:</strong></td>
<td>Standing behind the patient’s left shoulder.</td>
</tr>
</tbody>
</table>
**Hands/belt contact points:**

Position the cervical strap immediately below the left mastoid process of the occiput. The strap should be directed horizontally forward, towards the corner of the patient’s mouth. The strap lies on the posterior arch of C1 and then angles around the right side of the neck, and is held loosely by the patient with their left hand on their abdomen. The therapist directs the patient to ensure that the strap is in the correct position and the direction of force is maintained during the movement.

**APPLICATION GUIDELINES**

- Prior to applying the technique, the patient is advised about what to expect.
- The patient should feel a strong stretching sensation, but there should be no pain or other symptoms.
- The patient pulls on the strap with their right hand in a horizontal direction towards the corner of their mouth. The patient provides a gentle counterforce pressure with the left hand on the other end of the strap. At the same time the patient will actively rotate their head towards the right for a positive FRT to the right side. At the end of range of motion the therapist, or as a home exercise a trusted family member, will apply gentle over-pressure to the rotation movement while the patient maintains force along the strap. The over-pressure is maintained for 1–2 seconds before returning the head and neck to the neutral position.
- On the first occasion it is advisable to only perform the movement 2 times, and on subsequent visits increased repetitions can be used, but only if 2 repetitions does not produce lasting headache relief. The technique is repeated as a home exercise in the morning and evening.
- The patient is advised that no symptoms should be provoked during the technique. In addition, this technique would be contraindicated in the presence of vertebrobasilar artery insufficiency or craniovertebral ligament instability. The therapist should be familiar with routine testing procedures for vertebrobasilar artery insufficiency and craniovertebral ligament stability.
- Very occasionally the patient may feel dizziness soon after the first application of the technique. In that case it is advisable to treat the dizziness using the techniques described in Chapter 2 of this book. This may be caused by a sudden increase in range at the C1/2 level. Hence, following a C1/2 self-SNAG to the right, as in this example, it would be advised to trial a right side C1 unilateral SNAG with right rotation as the first option to relieve dizziness.

**COMMENTS**

- If the patient presents with significant symptoms on the day of treatment, it is preferable not to use the C1/2 self-SNAG. Rather, the patient should be treated using the other headache techniques in this chapter.
- On occasions the patient may report pain or other symptoms if the strap is not located correctly, or if the angle of the strap is inappropriate. In this case, reposition the strap and correct the angle of force. If pain or other symptoms persist then stop the technique.
- The technique may induce a mild headache in the evening that the technique is first applied. It is advisable to warn the patient of this potential. If headache symptoms are aggravated by the technique on subsequent days then the patient is advised to stop doing the exercise and return for evaluation by the therapist.
In the situation where there is bilateral restriction, the mobilisation technique is best applied to the most restricted side first and then if required to the other side after the first occasion.

This technique has been shown to be very efficacious when compared to a placebo treatment in a clinical trial with 12 month follow up (Hall et al., 2007).

**Annotations**

- sit C1 self belt SNAG Rot L x 2
- sit C1 self belt SNAG Rot L +OP(therapist) x 3
- sit C1 self belt SNAG Rot L +OP(partner) x 3
- sit C1 self towel SNAG Rot L x 2
- sit C1 self towel SNAG Rot L +OP(therapist) x 3
- sit C1 self towel SNAG Rot L +OP(partner) x 3

**Alternatives/Adjustments**

Rather than using the self-SNAG strap, it is also possible to use the selvedge edge of a towel to perform the C1/2 self-SNAG (see Figure 1.4). Alternatively, it is also possible for the therapist to use their thumbs to exert pressure on the C1 transverse process, on the contralateral side (Chapter 2, C1 dizziness technique). A strap or towel is preferred, as the patient will gain optimal benefit from self-treatment, both at the time of treatment, but also in event of recurrence later.

![Figure 1.4](image)

Towel C1/2 self-SNAG
HEADACHE SNAG

TECHNIQUE AT A GLANCE

- Patient sits in a chair with the back supported and head/neck in a neutral position.
- Therapist stands to the front and side of the patient.
- The therapist stabilises the patient's head against their body.
- The therapist's middle phalanx of the little finger contacts the posterior aspect of the patient's C2 spinous process.
- The therapist's thenar eminence of the non-contact hand presses anteriorly in the horizontal plane against the little finger of the opposite hand, sustaining the force for 10 seconds.
- Headache pain should be alleviated.
- See Figures 1.5 and 1.6.

![Figure 1.5](image1.png)  
Headache SNAG

![Figure 1.6](image2.png)  
Headache SNAG close-in-shot

INDICATION

Headache or other symptoms present at the time of technique application.

POSITIONING

| Patient: | Sitting with the back supported against an upright chair. |
Treated body part: Relaxed neutral position of the head and neck. Hands resting on their lap.

Therapist: Step stance position facing the patient, leg adjacent to patient stepped back, with the therapist's pelvis used to hold the patient's trunk against the support of the chair. The therapist can stand on the right or left side of the patient.

Hands/belt contact points: The therapist places their contact hand around the back of the patient's head, with the middle phalanx of the little finger lying across the posterior aspect of the C2 spinous process. The thenar eminence of the therapist's other hand presses against the little finger of the contact hand.

APPLICATION GUIDELINES

- It is important to stabilise the patient's head in neutral position when applying the technique. There should be no movement of the head.
- Force is generated by the therapist pressing the little finger of the contact hand with the thenar eminence of the other hand. The direction of force should be horizontal, in the plane of the upper cervical facet joints. In this respect the little finger of the contact hand is the locator for the application of force generated by the thenar eminence of the opposite hand (motive hand).
- Gentle force is all that is usually required for the technique to be effective.
- Maintain the applied force for 10 seconds. If the patient's headache is significantly reduced then the technique is repeated up to 6–10 times. If the headache is increased the technique should be abandoned and the reverse headache SNAG trialled.
- If there is contact soreness of the little finger on the spinous process then a small piece of sponge rubber can be used to soften the contact. In addition, as with a cervical NAG, an extremely gentle traction force may make the technique more comfortable or provide a greater symptom relief to the patient.

COMMENTS

- If symptoms are reduced then trial a self-headache SNAG, as detailed in the following technique. This should be attempted early in the treatment session before all pain is alleviated, so that the patient can understand how to apply the technique and the therapist can judge the self-treatment's effectiveness. This will also improve compliance and assist in self-efficacy.
- There is preliminary, low level evidence, that these techniques are effective when combined with other treatment modalities in patients with upper cervical symptoms (Lincoln 2000; Richardson 2009).

ANNOTATION

- sit C2 HA SNAG x 10sec
- sit C2 HA SNAG x 10sec(6)
- sit C3 HA SNAG x 10sec(6)

Alternatives/Adjustments

If symptoms are only marginally reduced, try applying the same technique with either more force, or a slightly different angle to the force (e.g. angled away from the side of pain to the contralateral side), or for a longer duration. The technique may also be applied to the C3 spinous process, although the angle of force will be approximately 45° to the horizontal plane, in the direction of the patient's eyes,
SELF-HEADACHE SNAG

TECHNIQUE AT A GLANCE

- Patient sits in a chair with their back supported and head/neck in neutral position.
- A cervical self-SNAG strap is placed around the posterior aspect of their C2 spinous process.
- The patient holds the strap with two hands pulling in a forward and horizontal direction.
- The patient gently retracts their head against the fixation of the strap, sustaining for 10 seconds and repeating as often as required to alleviate headache.
- See Figure 1.7.

![Self-headache SNAG](image)

Figure 1.7
Self-headache SNAG

INDICATION

Headache or other head symptoms positively responding to a headache SNAG.

POSITIONING

<table>
<thead>
<tr>
<th>Patient:</th>
<th>Sitting with their back supported against a hard backed, upright chair.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated body part:</td>
<td>Relaxed neutral position of the head and neck. Holding an end of a cervical self-SNAG strap in each hand, with the strap horizontal across the posterior aspect of the C2 spinous process, which is the first bony bump below the occiput.</td>
</tr>
</tbody>
</table>
### Self-glide description:
The strap is held in both hands and gently tensioned horizontally forward to fixate the C2 vertebra forward.

### EXERCISE GUIDELINES
- With the strap in place and the C2 vertebra fixed, the patient is shown how to very gently retract the head and upper cervical spine.
- The retraction force is maintained for 10 seconds.
- The exercise may be repeated until the headache resolves or it may be used preemptively to prevent headache return.

### COMMENTS
- Make sure the patient starts from a neutral position of the head and neck. The patient learns that the C2 spinous process is the first ‘bony bump’ below the occiput, so that they know where to place the strap or selvedge edge of the towel. Make sure the patient does not use excessive force when retracting.
- The selvedge edge of towel may be used in place of a self-SNAG strap.

### ANNOTATIONS
- sit C2 self belt HA SNAG x 10sec
- sit C2 self towel HA SNAG x 10sec(6)

### Alternatives/Adjustments
On occasions the patient may need to sustain the force for longer than 10 seconds to achieve a reduction in headache.
REVERSE HEADACHE SNAG

TECHNIQUE AT A GLANCE

- Patient sits in a chair with their back supported and head/neck in neutral position.
- Therapist stands to the front and side of the patient.
- The therapist stabilises the patient’s neck by fixing the C2 vertebra with their thumb and middle fingertip in front of the transverse process.
- The therapist’s other hand cups around the posterior aspect of the patient’s occiput.
- Therapist gently pulls the head anteriorly in a horizontal plane sustaining the force for 10 seconds.
- See Figures 1.8 and 1.9.

**Figure 1.8**
Reverse headache SNAG

**Figure 1.9**
Reverse headache SNAG close-in-shot

INDICATION

Headache or other symptoms present at the time of technique application. Usually the Headache SNAG is trialled first and if unsuccessful the Reverse Headache SNAG is tested.
POSITIONING

<table>
<thead>
<tr>
<th>Patient:</th>
<th>Sitting with their back supported against a hard backed, upright chair.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated body part:</td>
<td>Relaxed neutral position of the head and neck. Hands resting on their lap.</td>
</tr>
<tr>
<td>Therapist:</td>
<td>Step stance facing the patient, leg adjacent to patient stepped back, with the therapist’s lower abdomen and hip used to stabilise the patient’s trunk. The therapist can stand on the right or left side of the patient.</td>
</tr>
<tr>
<td>Hands contact points:</td>
<td>The therapist places one hand around the back of the patient’s occiput with the fingers spread around the back of the occiput. Using the thumb and middle finger of the opposite hand, grasp around the lateral aspects of the C2 transverse processes using a lumbrical grip, if the neck of the patient is large, or if the neck is small then grasp the anterior aspect of the C2 transverse processes bilaterally.</td>
</tr>
</tbody>
</table>

APPLICATION GUIDELINES

- It is important to stabilise the patient’s neck when applying the technique. There should be no movement of the trunk or lower neck.
- The gliding force should be in the horizontal plane, in a manner to achieve translation of the head on neck rather than extension of the neck.
- Gentle force is all that is required.
- Maintain the applied force for 10 seconds. If the patient’s headache is significantly reduced then the technique is repeated 6–10 times.

COMMENTS

- If symptoms are reduced then trial a self-reverse headache SNAG (see technique within this chapter). This should be attempted early in the treatment session before all pain is alleviated, so that the patient can understand how to apply the technique and be effective.
- In the rare event that the patient has upper cervical instability, perhaps a damaged or absent transverse ligament, then this technique would be provocative and stress the spinal cord hence is contraindicated.

ANNOTATIONS

- sit rev HA SNAG x 10sec
- sit rev HA SNAG x 10sec(6)

Alternatives/Adjustments

If symptoms are only marginally reduced, then try applying the same technique with either slightly more gliding force, a slightly different angle to the force and/or for longer duration. The addition of minimal axial traction may also improve outcomes, as may the prescription of a self-fist traction as a home programme technique if the patient responds well to reverse headache SNAGs (see self-fist traction technique described in Chapter 3).
SELF-REVERSE HEADACHE SNAG

**TECHNIQUE AT A GLANCE**

- Patient sits in a chair with their back supported and head/neck in neutral position.
- A cervical self-SNAG strap is placed around the posterior aspect of occiput.
- The patient holds the strap with two hands gently pulling in a forward and horizontal direction.
- The patient gently retracts their neck, sustaining for 10 seconds and repeating as often as required to alleviate headache.
- See Figure 1.10.

![Figure 1.10](image)

Self-reverse headache SNAG

**INDICATION**

Headache or other head symptoms positively responding to a reverse headache SNAG.

**POSITIONING**

<table>
<thead>
<tr>
<th>Patient:</th>
<th>Sitting with their back supported against a hard backed, upright chair.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated body part:</td>
<td>Relaxed neutral position of the head and neck. Holding an end of a cervical self-SNAG strap in each hand, with the strap horizontal.</td>
</tr>
<tr>
<td>Self-glide description:</td>
<td>The patient stabilises the occiput with the cervical self-SNAG strap by gently pulling horizontally forward, hooking against the back of the occiput.</td>
</tr>
</tbody>
</table>
EXERCISE GUIDELINES

- With the strap in place and the occiput fixed, the patient is shown how to retract the neck, in effect protracing the head on neck.
- The force is maintained for 10 seconds.
- The exercise may be repeated until the headache resolves or it may be used pre-emptively to prevent headache return.

COMMENTS

- Make sure that the patient starts from a neutral position of the head and neck. Make sure the patient does not use excessive force when retracting.
- The selvedge edge of towel may be used in place of a self-SNAG strap.

ANNOTATIONS

- sit self belt rev HA SNAG x 10sec
- sit self towel rev HA SNAG x 10sec(6)

Alternatives/Adjustments

On occasions the patient may need to sustain the force for longer than 10 seconds to achieve a reduction in headache.
UPPER CERVICAL SPINE TRACTION

TECHNIQUE AT A GLANCE

- Patient lays supine with the head/neck in neutral position.
- The therapist sits on a chair at the end of the plinth facing the patient’s head.
- The therapist places their supinated forearm of the contact arm underneath the patient’s neck.
- The therapist’s other hand fixes underneath the patient’s chin.
- The therapist’s contact forearm pronates against the patient’s occiput, sustaining the force for at least 10 seconds, repeating as required.
- Headache pain should be alleviated.
- See Figures 1.11 and 1.12.

![Figure 1.11](image1)  
Upper cervical spine traction

![Figure 1.12](image2)  
Upper cervical spine traction close-in-shot

INDICATION

Headache, neck pain, or other symptoms present at the time of technique application. Usually this technique could be used if there were a poor response to a Headache SNAG or Reverse Headache SNAG.
### POSITIONING

<table>
<thead>
<tr>
<th>Patient:</th>
<th>Lying supine on a treatment plinth.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated body part:</td>
<td>Relaxed neutral position of the head with neutral to slight extension of the neck. Hands resting on their lap.</td>
</tr>
<tr>
<td>Therapist:</td>
<td>Sitting at the head of the patient, facing towards their feet, with the mid portion of the therapist’s supinated forearm placed under the patient’s upper cervical spine.</td>
</tr>
<tr>
<td>Hands/belt contact points:</td>
<td>The radius of the therapist’s forearm under the upper cervical spine rests against the inferior aspect of the patient’s occiput. The therapist’s other hand stabilises under the patient’s chin to prevent cervical flexion during traction.</td>
</tr>
</tbody>
</table>

### APPLICATION GUIDELINES

- If the patient has an increased thoracic kyphosis a small folded towel may be placed under the patient’s head to keep the neck in a neutral to slight extension position.
- The therapist pronates the forearm to generate pressure against the patient’s occiput.
- At the same time the therapist stabilises the patient’s chin to prevent upper cervical flexion. The resultant force should be traction, which is perpendicular to the long axis of the cervical spine and therefore a true traction of the upper cervical joints.
- Maintain the force for at least 10 seconds and monitor the headache symptoms. If symptoms increase then stop immediately. If symptoms reduce then the technique may be repeated several times.

### COMMENTS

- In some patients, neck traction causes discomfort in the lumbar spine due to sensitivity of neuromeningeal structures. In this case flexion of the patient’s hips and knees will assist in reducing this discomfort.
- In other patients who have pain from an excessive lumbar lordosis, discomfort may be alleviated again by hip and knee flexion together with posterior pelvic tilt.
- If there is any discomfort from contact over the spinous process, then this may be reduced by the therapist using a slightly thicker part of their forearm, so that the forearm muscles create a soft pad for contact.

### ANNOTATIONS

- sup ly upper Cx Fra Tr x 10sec
- sup ly upper Cx Fra Tr x 10sec(6)

### Alternatives/Adjustments

If symptoms are only marginally reduced, then try applying the same technique with either more force, or a slightly longer duration.
SELF-UPPER CERVICAL SPINE TRACTION

TECHNIQUE AT A GLANCE

- Patient lays supine with the head/neck in neutral position.
- Patient places a rolled towel under the upper cervical spine.
- The patient manoeuvres themselves so that the head just clears the support of the table. The weight of the head creates a traction force against the fulcrum of the rolled towel.
- Sustain the position for 30 seconds or more and repeat as required.
- See Figure 1.13.

![Image](Figure 1.13)  
Self-upper cervical spine traction

INDICATION

Headache, upper neck pain, or other head symptoms positively responding to upper cervical traction.

POSITIONING

<table>
<thead>
<tr>
<th>Patient:</th>
<th>Lying supine on a firm table or bed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated body part:</td>
<td>Relaxed neutral position of the head with neutral to slight extension of the upper cervical spine. The patient places a small (approximately 5 cm) diameter rolled towel under the upper neck, immediately below the occiput. The head must lie so that the occiput just clears the end of the table.</td>
</tr>
<tr>
<td>Self-glide description:</td>
<td>The patient relaxes the head and neck muscles. The weight of the head will generate a mild traction force against the contact point of the towel on the C2 spinous process by dropping slightly into upper cervical extension.</td>
</tr>
</tbody>
</table>
EXERCISE GUIDELINES

- The contact point of the rolled towel immediately below the occiput is critical to the effectiveness of the traction.
- The rolled towel must be on the edge of the table to act as a pivot point for the weight of the head to generate the traction force.
- The patient sustains the traction for initially 30 seconds. If the headache is relieved, then longer traction periods up to 5 minutes or sometimes longer can provide sustained relief.

COMMENT

Make sure that the patient does not allow the neck to fall into excessive extension.

ANNOTATIONS

- sup ly upper Cx self towel roll Tr x 30sec
- sup ly upper Cx self towel roll Tr x 5min

Alternatives/Adjustments

It may be possible to teach the patient’s partner, or another family member, to perform the traction technique. This may be easier than the patient performing the home exercise just described.

CLINICAL REASONING GEM

Determining the cause of a patient’s headache can be a diagnostic challenge for the practitioner. The techniques described in this chapter can assist the clinician’s reasoning processes as they can be used to quickly determine whether headache symptoms arise from the cervical spine or from another possible source. The techniques are easy to apply and safe to use if applied within a clinical reasoning framework, such as that advocated by the International Federation of Orthopaedic Manipulative Physical Therapists (IFOMPT) (Rushton et al., 2012). The key principle is that if the headache can be altered by subtly applying different directions of force to the upper cervical spine, then it is very likely that the headache is cervicogenic and both clinical experience and scientific evidence indicates it will respond favourably to manual treatment techniques and home exercise directed to the cervical spine. The practitioner’s diagnostic accuracy and treatment efficacy for this disorder will improve with self-reflection and improved recognition of cervicogenic headache clinical patterns amongst the myriad of other headache presentations.

Levels of evidence

Level 1b: 1 RCT, and 1 case report