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 (The International Classification of Headache Disorders, 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 does 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 the 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 owing 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 et al., 2010a). The positive cut-off point is 32°–33° (Hall et al., 2010b, 2010c; Ogince et al., 2007). An MRI study revealed that a positive test primarily indicates limitation of movement at the C1/2 level (Takasaki et al., 2011). 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 et al., 2008). 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 ROM 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.

Levels of evidence

Level 2: four RCTs and one case report

The available evidence suggests that application of the SNAG technique improves cervical ROM in patients with CGH and positive FRT. 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 controlled trial (RCT) (Hall et al., 2007). Hall and colleagues (Hall et al., 2007) showed that when compared with the placebo the self-SNAG improved range recorded during the FRT by 10° (95% confidence interval (CI): 4.7–15.3°) immediately after application and that at 12 months the treated group were 22 (13–31) points superior on the headache severity index (baseline headache severity index approximately 54/100). When investigating the effectiveness of different types of manual therapy techniques in information technology professionals with a positive FRT and CGH, Neeti (2017) also reported a 9.3°±2.1 improvement in cervical ROM in the group who received SNAG treatment. Such improvement was significantly superior to that of the group that received Maitland treatment (6.6°±1.6) and of the control group (2.9°±1.0) after 1 week of treatment.

Similarly, Shin and Lee (2014) demonstrated a significant reduction in pain (VAS 27.12 mm+14.66), Neck Disability Index (NDI) (3.20+1.39) and headache duration (3.20+1.39) after 4 weeks of treatment in patients who received SNAG treatment compared with the control group who received a placebo SNAG treatment. An RCT comparing the efficacy of C1–C2 SNAG with posterior anterior vertebral mobilisations (PAVMs) in the management of cervicogenic headaches revealed superior outcomes after the sixth treatment session for patients who received the SNAG treatment (Khan et al., 2014). Khan and colleagues (Khan et al., 2014) demonstrated that the group who received SNAG treatment had a 20% greater reduction in the NDI compared with the PAVMs group. The reduction in pain, assessed through the visual analogue scale (VAS), for the SNAG group was 15.5% greater than that perceived by the PAVMs group (Khan et al., 2014).

1 FLEXION–ROTATION TEST

TECHNIQUE AT A GLANCE

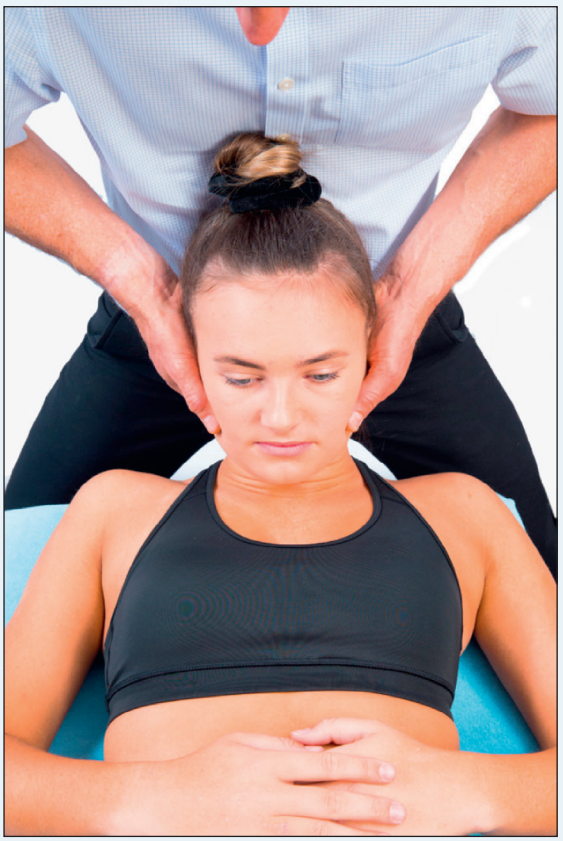

Figure 1.1
Flexion–rotation test: start position

Figure 1.2
Flexion–rotation test: normal end range

Figure 1.3
Flexion–rotation test: side view

- The patient lies supine with shoulders level with the end of the plinth.
- The patient's head is supported by the therapist's abdomen.
- The therapist passively carefully moves the patient's neck into end-range flexion, translating the head forwards.
- The patient's head is held in this position and then passively rotated to each side and the range recorded.
- See Figs 1.1–1.3.

INDICATION

Headache of possible cervical spine origin or upper cervical symptoms.

POSITIONING

Patient:	Lying supine, shoulders level with the end of the couch.
Treated body part:	Relaxed end-range cervical spine and upper thoracic spine flexion.
Therapist:	Standing at the head of the patient facing their feet with the patient's head supported on the therapist's abdomen.
Hands/contact points:	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.

APPLICATION GUIDELINES

- End-range flexion is essential to apply the test.
- At end-range cervical spine flexion and with the head translated forwards, cervical rotation to the left and right is noted. Make sure rotation of the head/neck is as pure as possible and no lateral flexion is allowed.
- The end point is either resistance or pain, whichever comes first.
- The 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; Schäfer et al., 2018).
- 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 et al., 2010c).
- Typically range is restricted towards the side of the headache. However, in approximately 20% of cases the limitation may be to the opposite side of the headache.
- Range may be limited to both sides.

VARIATIONS

- The FRT may be performed actively in a seated position (Amiri et al., 2003); however, the validity of this test variant to measure upper cervical impairment has not been determined and the ROM is known to be different to that determined in supine (Bravo Petersen & Vardaxis, 2015). The supine position is also preferred because of the ease of measuring ROM, and potentially there will be less stress on the neuromeningeal system in a supine position.

COMMENTS

- Ensure that there is no axial compression force applied through the patient's head/neck. Translate the head/neck forwards, 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 (Takasaki et al., 2011). Failure to maintain the end-range flexed position may give a false-negative finding, as movement may occur at other cervical levels.
- The ROM is much greater in children. In general there is on average 9° greater range to each side in children between the ages of 6 and 12 years (Budelmann et al., 2016). However, the FRT can still be used to identify asymmetry in those children who suffer from CGH (Budelmann et al., 2013).
- In the presence of a sensitised neuromeningeal system, it is advisable to perform the FRT with the patient's knees flexed to 90°.
- ROM during the test may be impacted by the presence of temporomandibular dysfunction (Grondin et al., 2015; von Piekartz & Hall, 2013).

1

C1/2 SELF-SNAG

TECHNIQUE AT A GLANCE

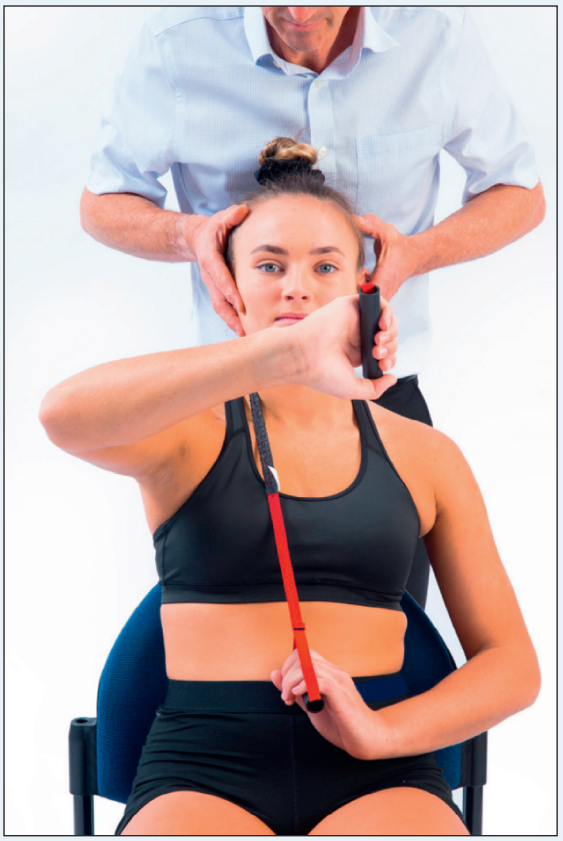

Figure 1.4
C1/2 self-SNAG: start position

Figure 1.5
C1/2 self-SNAG: end-range position

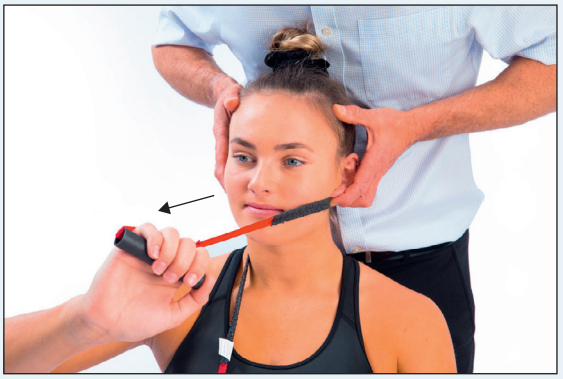

Figure 1.6
C1/2 self-SNAG: side view

- The patient sits in a chair with their back supported.
- The patient places a self-SNAG strap on the posterior arch of C1, below the mastoid process on the contralateral side of the restriction.
- With the hand on the side of the restriction, the patient pulls the strap horizontally forwards 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 Figs 1.4–1.6.

INDICATION

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

POSITIONING (See Figs 1.4–1.6)

Patient:	Sitting with their back supported against a hard-backed, upright chair.
Treated body part:	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.
Therapist:	Standing behind the patient's left shoulder.
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 (Figs 1.4–1.6). 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 rotation 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 the patient returns the head and neck to the neutral position.
- On the first occasion it is advisable to perform the movement only 2 times, and on subsequent visits increased repetitions can be used, but only if 2 repetitions do 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 (p. 45). 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.

(continued next page...)

VARIATIONS

- 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 Fig. 1.7). Alternatively, it is also possible for the therapist to use their thumbs to exert pressure on the C1 transverse process, on the contralateral side (see Chapter 2, C1 dizziness technique, p. 45). A strap or towel is preferred, as the patient will gain optimal benefit from self-treatment, both at the time of treatment and also in the event of later recurrence.

Figure 1.7
Towel C1/2 self-SNAG

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 with a placebo treatment in a clinical trial with 12-month follow-up (Hall et al., 2007). There have been three other RCTs showing the benefits of this technique over other forms of treatment including Maitland mobilisation and neck motor control exercises (Khan et al., 2014; Nambi et al., 2014; Neeti, 2017).

ANNOTATIONS

sit C1 self belt SNAG Rot R×2
sit C1 self belt SNAG Rot R +OP(therapist)×2
sit C1 self belt SNAG Rot R +OP(partner)×2
sit C1 self towel SNAG Rot R×2

HEADACHE MWM

TECHNIQUE AT A GLANCE

Figure 1.8
Headache MWM: start position

Figure 1.9
Headache MWM: end position

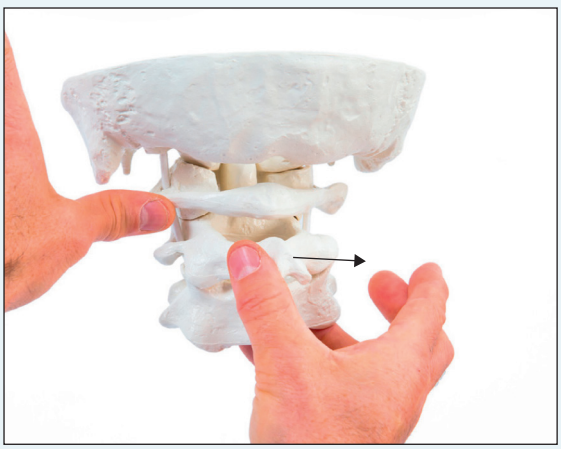

Figure 1.10
Headache MWM: bone view

- The patient sits in a chair with their back supported.
- The therapist places their left thumb on the posterior arch of C1, below the mastoid process on the ipsilateral side of restriction. The medial edge of the right thumb contacts the left side of the spinous process of C2.
- Forward pressure is exerted on C1 with counterforce against the spinous process.
- While the pressure is sustained, the patient rotates the head/neck towards the restricted side.
- Apply over-pressure only if the patient is symptom-free at end range.
- See Figs 1.8–1.10.

1

INDICATION

Headache, neck pain, together with a unilateral or bilateral restriction on the FRT.

POSITIONING (See Figs 1.8–1.10)

Patient:	Sitting with their back supported against a hard-backed, upright chair.
Treated body part:	Relaxed neutral position of the head and neck. Hands resting on the lap.
Therapist:	Standing behind the patient on the side of restriction.
Hands/belt contact points:	The therapist places their left thumb on the posterior arch of C1, below the mastoid process on the ipsilateral side of restriction. The medial edge of the right thumb contacts the left side of the spinous process of C2.

APPLICATION GUIDELINES

- Prior to applying the technique, the therapist advises the patient about what to expect.
- The patient should feel firm pressure on the neck but no pain or other symptoms.
- The therapist places their left thumb on the posterior arch of C1, below the mastoid process on the ipsilateral side of restriction. The medial edge of the right thumb contacts the left side of the spinous process of C2. At the same time the patient will actively rotate their head towards the left for a positive FRT to the left side. At the end of range of rotation the patient will apply gentle over-pressure to the rotation movement while the therapist maintains pressure on C1 and C2. 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 perform the movement only 3 times; on subsequent visits increased repetitions can be used, but only if 3 repetitions do not produce lasting headache relief.
- 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 these conditions.

COMMENTS

- If the patient presents with significant symptoms on the day of treatment, it is preferable not to use this technique. Rather, the patient should be treated using the other headache techniques in this chapter.
- On occasion the patient may report pain or other symptoms if the therapist's hand contact is not applied correctly, or if the angle of the mobilisation is inappropriate. In this case, alter the contact points and correct the angle of force. If pain or other symptoms persist then stop the technique.
- 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.

ANNOTATIONS

sit L C1 Ant gl+L C2 trans gl MWM Rot L×3
sit L C1 Ant gl+L C2 trans gl MWM Rot L +OP×3

HEADACHE SNAG

TECHNIQUE AT A GLANCE

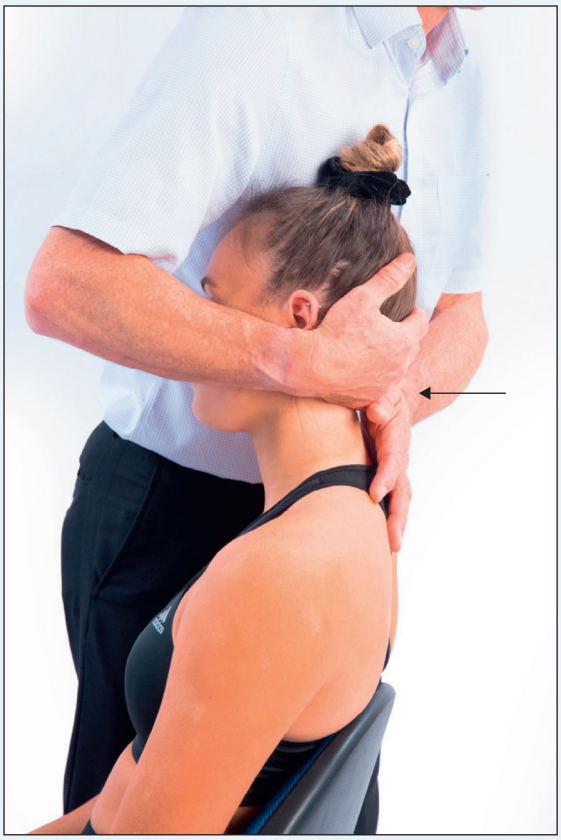

Figure 1.11
Headache SNAG

Figure 1.12
Headache SNAG: close view

Figure 1.13
Headache SNAG: bone view

- The patient sits in a chair with the back supported and head/neck in a neutral position.
- The 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 Figs 1.11–1.13.

1

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 the 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 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 natural apophyseal glide (NAG), an extremely gentle traction force may make the technique more comfortable or provide greater symptom relief to the patient.

ALTERNATIVES

- 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.

COMMENTS

- There is preliminary evidence that these techniques are effective when combined with other treatment modalities in patients with upper cervical symptoms (Lincoln, 2000; Richardson, 2009).

SELF-MANAGEMENT

- If symptoms are reduced then trial a self-headache SNAG (Fig. 1.14). 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.
- The patient places a self-SNAG strap on the posterior aspect of the spinous process of C2 (Fig. 1.14) to affect the levels C0/1 and C1/2 and on the spinous process of C3 to affect the C2/3 level. The patient is directed to pull the strap horizontally forwards, with each side parallel to each other and to the ground. The patient retracts the head against the fixation of the strap for 10 seconds. The exercise can be repeated 6–10 times as required to alleviate the headache.

Figure 1.14
Self-headache SNAG with a strap

ANNOTATION

sit C2 HA SNAG×10 sec
sit C2 HA SNAG×10 sec (Hall et al., 2010c)
sit C3 HA SNAG×10 sec (Hall et al., 2010c)
sit C2 self strap HA SNAG×10 sec (Hall et al., 2010c)
sit C3 self strap HA SNAG×10 sec (Hall et al., 2010c)

1 REVERSE HEADACHE SNAG

TECHNIQUE AT A GLANCE

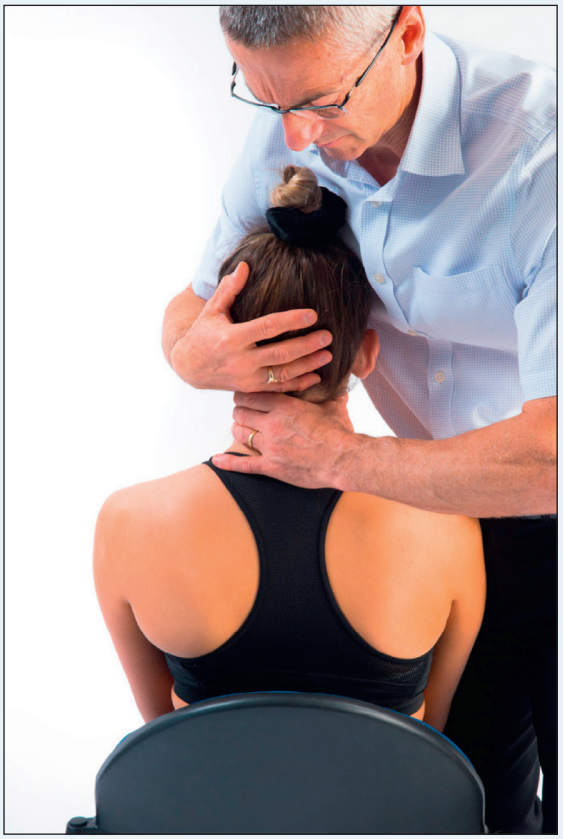

Figure 1.15
Reverse headache SNAG

Figure 1.16
Reverse headache SNAG: close view

Figure 1.17
Reverse headache SNAG: bone view

- The patient sits in a chair with their back supported and head/neck in neutral position.
- The 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 or against the C2 spinous process.
- The therapist's other hand cups around the posterior aspect of the patient's occiput.
- The therapist gently pulls the head anteriorly in a horizontal plane, sustaining the force for 10 seconds.
- See Figs 1.15–1.17.

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.

CONTRAINDICATION

Upper cervical ligament deficiency, particularly transverse ligament laxity.

POSITIONING

Patient:	Sitting with their back supported against a hard-backed, upright chair.
Treated body part:	Relaxed neutral position of the head and neck. Hands resting on the lap.
Therapist:	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.
Hands contact points:	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 spinous and transverse processes using a lumbrical grip, if the neck of the patient is large. If the neck is small, then grasp the anterior aspect of the C2 transverse processes bilaterally.

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 the 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.

VARIATIONS

- 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 either a self-reverse headache SNAG (Fig. 1.18) or a self-fist traction as a home programme technique if the patient responds well to reverse headache SNAGs (see fist traction technique described in Chapter 3).

COMMENTS

- 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, and hence is contraindicated.

(continued next page...)

SELF-MANAGEMENT

- If symptoms are reduced then trial a self-reverse headache SNAG (Fig. 1.18). 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.
- The patient places a self-SNAG strap on the posterior aspect of the skull. The patient is directed to pull the strap horizontally forwards, with the sides parallel to each other and to the ground. The patient retracts the neck against the fixation of the strap for 10 seconds. The exercise can be repeated 6–10 times as required to alleviate the headache.

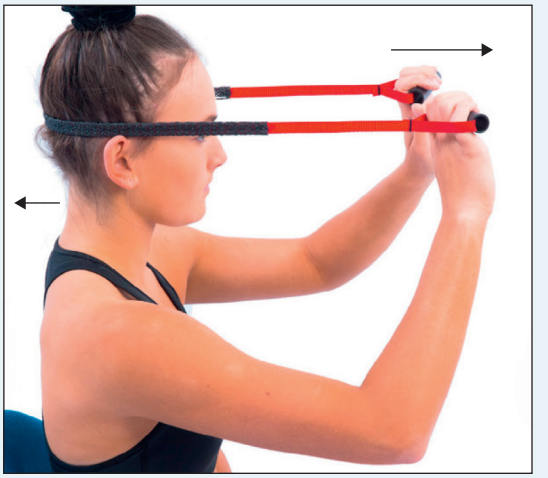

Figure 1.18
Self-reverse headache SNAG

ANNOTATIONS

sit rev HA SNAG×10 sec
sit rev HA SNAG×10 sec (Hall et al., 2010c)
sit self strap Rev HA SNAG×10 sec (Hall et al., 2010c)

UPPER CERVICAL TRACTION

TECHNIQUE AT A GLANCE

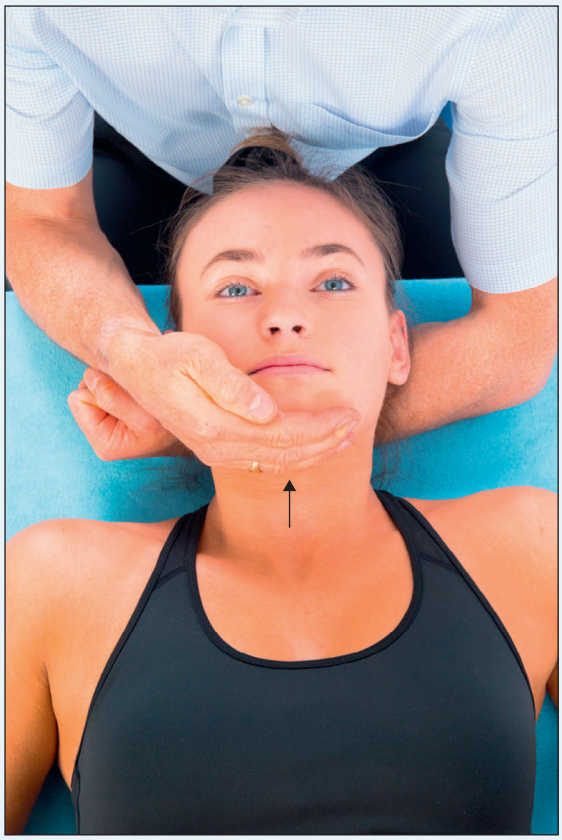

Figure 1.19
Upper cervical traction: start position

Figure 1.20
Upper cervical traction: close view

Figure 1.21
Upper cervical traction: end position

- The patient lies 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 Figs 1.19–1.21.

1

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

Patient:	Lying supine on a treatment plinth.
Treated body part:	Relaxed neutral position of the head with neutral to slight extension of the neck. Hands resting on the lap.
Therapist:	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.
Hands/belt contact points:	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.

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.

VARIATIONS

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

COMMENTS

- In some patients, neck traction causes discomfort in the lumbar spine owing 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, 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.