

NAT Pro Series:

Treating Headaches

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Welcome

According to the World Health Organization¹ an estimated 47% of adults had a headache at least once within last year.

Headaches (cephalalgia) cause a ‘world of pain’ and disability, and sufferers are highly motivated to seek treatment or intervention; more often than not they reach straight for the ‘medicine bottle’, but is that the best course of action? Chronic daily headaches (CDH) are thought to affect 4-5% of adults and medication overuse is a huge issue for this group. Headaches of mechanical component are by far the most significant; they are well documented with a substantial evidence base. The two most common types of mechanical headache are Tension Type Headaches (TTH) which affect an estimated 3% of the population and Cervicogenic headache (CGH) which affects an estimated 0.4% - 2.5% of the population. These types of headache are often associated with stiff and tight neck joints and muscles.

Muscles are designed to move joints from A to B; that is their *raison d’être*. If a muscle can’t excuse fully it tends to become stiffer, tighter and develop taut bands; in fact, over time, changes in the fibroblast activity make it become more fibrous – a bit like a ligament. Changes in neck mechanics over time can manifest as muscular knots or ‘trigger points’. Trigger points can develop in muscles for a number of reasons. When present they cause the host muscle to be shorter, tighter and less efficient. Trigger points can also add to the cycle of increased input to the peripheral and central nervous system. Treating trigger points in neck muscles can have both immediate and long lasting effects for both TTH, CGH and even migraines, it can also reduce the patients’ dependency on medication.

This course is designed to help you understand mechanical headaches in more depth, and to offer you a clear hands-on pathway for treatment and management. We passionately believe that an understanding of

trigger points and how to use them will give you valuable extra tools for treatment. Weaving trigger points into your massage or soft tissue routines can have truly profound effects. Combine this with self-help, stretching and advice on lifestyle modification and you should be able to help the majority of those in pain.

At the end of this course you will find a reflective learning exam. This is not a 'pass or fail' test but a mechanism to see that you have understood the information and can apply it for the good of your patients. We are excited to share this information with you and don't forget that if you have any questions we are here to support you.

Contents

<i>Welcome</i>	3
<i>Introduction</i>	6
<i>Tension Type Headaches</i>	9
<i>Cervicogenic Headaches</i>	16
<i>Migraine Headaches</i>	18
<i>Medication Overuse Headaches</i>	24
<i>Cluster Headache</i>	24
<i>Sinus Headaches</i>	25
<i>Greater Occipital Neuralgia</i>	28
<i>TMJD Headache</i>	29
<i>Clinical History</i>	32
<i>Examination and Testing</i>	33
<i>Differential Diagnosis</i>	38
<i>The Main Muscles</i>	41
<i>Trigger Points 101</i>	60
<i>Beyond the Trigger Point</i>	70
<i>Treatment</i>	79
<i>NAT Algorithm</i>	99
<i>Advice and Exercises</i>	107
<i>References</i>	120

Introduction

Chronic Daily Headache (CDH) has a prevalence of 4-5% of adults. It affects males to females in a 1:2-3 ratio. These headaches often start as episodic but can 'transform' over time to CDH. Medication (rebound) induced headache is believed to play a role in up to 30% of CDH patients². Interestingly 50-80% of those treated in tertiary headache centers, are recorded as having 'medication overuse'. Those with CDH often have a poorer quality of life than 'episodic headachers'. CDH can be either primary or secondary.

Whilst many people reach for the bottle, some realize that medications can mask underlying mechanical problems such as stiff and tense muscles and look to us for long term help. For these reasons manual therapy has become 'a popular choice' for patients with common and benign forms of headaches, such as Cervicogenic (CGH) and Tension Type (TTH), because these two conditions are often associated with mechanical neck pain.³

Symptoms and causes of headaches

A headache is defined as 'aching or pain in one or more areas of the head or neck'. Both the frequency and pain level can vary greatly. Depending on the classification between 65-90 percent of all headaches are due to Tension Type Headaches (TTH)⁴. The remaining 10-35 percent are: migraines, neck based/Cervicogenic headaches (CGH), TMJ type, sinus and cluster headaches. In terms of trigger point therapy TTH & CGH are the most accessible and amenable to intervention, although some authorities recognize that trigger points may have an important role to play in relieving migraines.

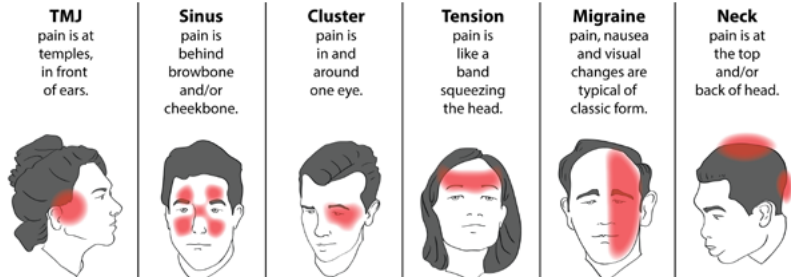
How are they classified?

Headaches are defined as primary or secondary. Primary headaches are benign, recurrent headaches not caused by underlying disease or structural problems. For example, migraine is a type of primary headache. While primary headaches may cause significant daily pain and disability, they are not dangerous. Secondary headaches are caused by an underlying disease, like an infection, head injury, vascular disorders, brain bleed or tumors. Secondary headaches can be harmless or dangerous. Certain 'red flags' or warning signs indicate a secondary headache may be dangerous.

Here is a list of conditions that are known to cause a secondary headache:

- Sinus headache
- Giant cell arteritis (associated with polymyalgia rheumatica)
- Carotid artery dissection (in the neck)
- Vasculitis
- Headache associated with nonvascular intracranial disorders
- Neoplasm (tumors)
- Idiopathic intracranial hypertension
- Infection
- Post-traumatic headache
- Subdural hematoma
- Cervical spinal disorders (CGH)
- Temporomandibular joint (TMJ) dysfunction
- Headache caused by sleep disorders such as obstructive sleep apnea.

As you can see, a headache can be a sign that something very wrong is happening inside, so we must always approach them with caution. Fortunately most headaches are benign. Here is a table with characteristics of the most common types of headaches that should help deepen our understanding.



The International Headache Classification III (ICDH)

We will be following the standardized International Headache Classification III (ICDH) – a full classification can be found [here](#). This classification is hierarchical, and you must decide how detailed you want to make your diagnosis. A diagnosis should be based around the main headache that clients present with (over the last year). When a patient receives more than one diagnosis, these should be listed in the order of importance to the patient. To receive a particular headache diagnosis the patient must, in many cases, experience a minimum number of attacks of (or days with) that headache. When a patient is suspected of having more than one headache type or subtype, it is highly recommended that he or she fill out a ‘headache diary’ to record each headache episode.

Tension Type Headaches (TTH)

TTH are by far the most common type of chronic headache. People who experience migraines typically also have tension headaches in between their migraines these are also known as transformed headaches.

Prevalence of TTH and CGH

	Cervicogenic headache	Tension-type headache
General population (%)	0.4 – 2.5 %	3 %
Headache clinics (%)	15 – 20 %	40%
Mean age	42.9 y/o (all ages are affected)	Onset any age but most commonly during adolescence or young Adulthood
Gender	4 x more prevalent in female (79.1 % ♀ and 20.9 % ♂)	88 % female and 69 % male
Other	CGH is a common symptom after neck trauma; 54 % –66 % of patients with whiplash-associated disorder	Chronic TTH commonly occur during periods of stress and emotional upset.
Intensity	Moderate to severe	Mild to moderate

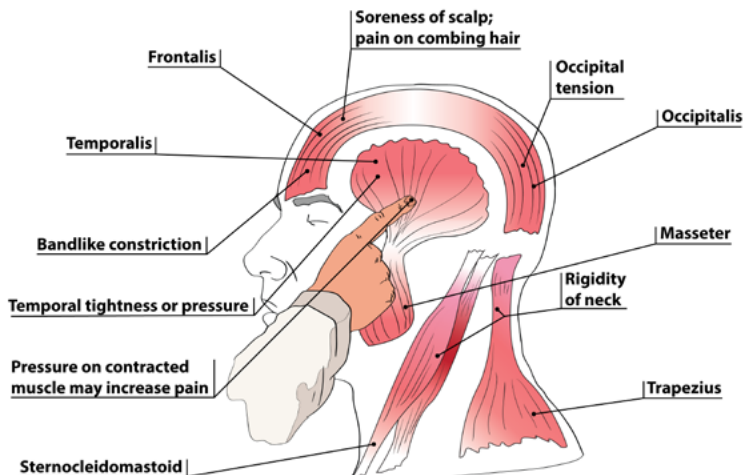
Symptoms of TTH

Tension headaches usually affect both sides of the head and last from thirty minutes to several days or more. They often have a characteristic tight-band or vice like pain with a ‘dull steady aching’ quality. Symptoms can vary in intensity from mild to moderate to severe; they may also affect sleep. They are not accompanied by the additional symptoms that traditionally distinguish migraine headaches such as light sensitivity (photophobia), flashes and patterns in the eyes (visual scotoma) and warning signs (prodromal). Tension headaches affect about 1.4 billion people (20.8% of the population) and are more common in women than men (23% to 18% respectively)⁵.

TTH and trigger points

Muscular problems and tension are commonly associated with TTH and trigger points within muscles may either be causative or may perpetuate TTH. The most commonly affected muscles are: trapezius, sternocleidomastoid, temporalis, masseter and occipitofrontalis. There is also a strong association with postural issues such as the upper crossed pattern. The pain processing part of the central nervous system is almost certainly involved in TTH as it shows up abnormal in scans. Trigger points often add to the misery of headaches because they are associated with peripheral and central sensitization (see later). Long-term inputs from trigger points may lead to a vicious cycle that converts periodic headaches into chronic tension headaches. In such cases even if the original initiating factor is eliminated, the trigger point-central sensitization cycle can perpetuate or even worsen.

TTH are often aggravated by stress, anxiety, depression, fatigue, noise, and glare, but they can also be associated with neck arthritis or neck disc problem.



Seven major causes of TTH

- Stress: usually occurs in the afternoon after long stressful work hours or after an exam
- Sleep deprivation
- Uncomfortable stressful position and/or bad posture
- Irregular meal time (hunger is reported in up to 50% of people)
- Eyestrain
- Tooth clenching (bruxism)
- Postural issues

Acute or Chronic

TTH headaches can be episodic or chronic. Episodic tension-type headaches are defined as tension-type headaches occurring fewer than 15 days a month, whereas chronic tension headaches occur 15 days or more a month for at least 6 months. Headaches can last from minutes to days, months or even years, though a typical tension headache lasts 4–6 hours

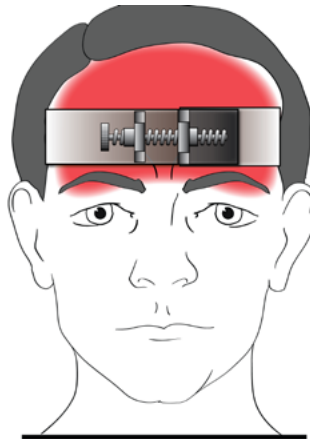
TTH fact file - (Vernon H, 2009)⁶

1. The most prevalent form of benign primary headache with a reported prevalence varying from 65-90%, depending on the classification, description, and severity of headache features.
2. The psychosocial impacts of TTH include disruptions of daily activities, quality of life & work and are accompanied by considerable costs.
3. The International Headache Society (IHS) characterizes TTH as bilateral headaches of mild-to-moderate intensity that experienced with an aching, tightening, or pressing quality of pain.
4. Headaches may last from 30 minutes to 7 days, are not accompanied by nausea or vomiting, and may have light sensitivity (photophobia) or sound sensitivity (phonophobia) but not both.
5. Headache frequency is classified as 'episodic' (<15 headaches per month) or 'chronic' (>15 per month).

**Starting often in the morning,
then worsening during the day**



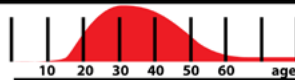
Experienced as
a tight band
across the forehead



Ratio M/F



Age range



6. Episodic TTH is by far the more prevalent category.
7. The chronic TTH patient has a higher frequency of both active and latent triggers points in the suboccipital mm.
8. The chronic TTH patient with active trigger points may have a greater headache intensity and frequency and forward head posture than those with latent trigger points.

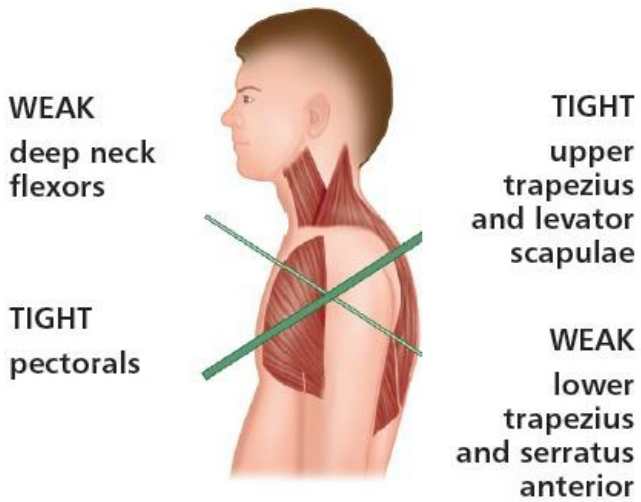
Posture and headaches

There are specific activities and maladaptive postures that serve as trigger point activators, either promoting ‘new’ trigger points to develop or causing latent ones to become active. These may cause a previously asymptomatic neck muscles to develop pain, especially the **sternocleidomastoid** (see later). Don’t forget that the head is heavy and any alteration in head or jaw posture will have an impact on the biomechanics. Furthermore, because the body is always trying to keep the eyes and ears level for balance, poor posture in any part of the body can lead to neck muscle compensation. The most common mechanical maladaptation’s are:

- Head-forward posture (upper crossed pattern: Janda)
- Round shoulders (upper crossed pattern: Janda)
- Head to one side—telephone posture
- Occupational/ergonomic stressors
- Slouched standing (lower crossed pattern: Janda)
- Slouched sitting (e.g. computer screen/ergonomics)
- Cross-legged sitting
- Habitual postures
- ‘Sway-back’ posture (lower crossed pattern: Janda)
- Driving position
- Scoliosis
- Joint hypermobility
- Lifting/carrying
- Primary short lower extremity (PSLE)

Two other key factors in neck pain are the mobility of the thoracic and cervical spine Lewis (2014)⁷ a stiff thoracic spine may be compensated for by a hypermobile neck (cervical spine). Janda (1996)^{8, 9, 10} identified ‘the upper crossed pattern’ with its tight and its short anterior chest muscles with weak and overstretched posterior shoulder muscles.

Janda's upper crossed pattern (1996)

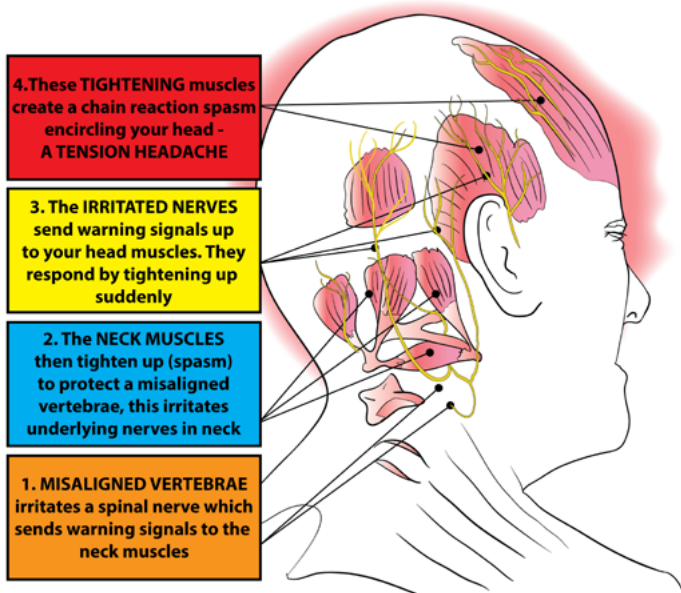


Cervicogenic Headache (CGH) - (Antonaci et al 2006)¹¹

First proposed by Sjaastad et al, CGH is defined as ‘referred pain perceived in any region of the head caused by a primary (nociceptive) source in the musculoskeletal tissues innervated by the cervical nerves’.¹² The source of the pain can be from any of the structures of the cervical spine¹³. These structures are innervated by the C1-C3 spinal nerves and include the¹⁴:

- Upper cervical synovial joints, ligaments;
- Muscles of the sub-cranial spine (specifically **splenius cervicis, splenius and semispinalis capitis, obliquus capitis, multifidus**);
- Discs (C2-C3);
- Pain-sensitive dura mater (the coverings of the spinal cord)

4 Step Tension Headache Process



Typically unilateral (hemicranial) CGH is characteristically provoked by neck movements, awkward head positions and/or pressure on tender points in the neck. CGH can last from hours to days. The pain is often described either as ‘dull’ or ‘piercing’. The underlying mechanisms, signs, symptoms and treatment are still of debate. The most commonly accepted neurophysiological explanation is that it is due to the convergence of the upper cervical roots on the (nucleus caudalis of the) trigeminal tract. Most cases of CGH are caused by pathology in the upper cervical spine. Trigger points are part of the bodies protect and defend mechanism (see later) and they may become permanently switched on if the underlying causes are not addressed. Anesthetic blocks can be used to confirm the diagnosis and determine the source of pain in the neck. Clearly, as in TTH, posture also has an important role to play.

Trigger points and CGH

There are several muscle trigger point worth exploring in CGH and trigger point intervention can be hugely beneficial when combined with stretching, exercise and self help. There is also some evidence supporting spinal manipulation and or articulation/mobilization as part of manual therapy. The key muscles are **upper trapezius, spleneus cervicis, spleneus capitis, semispinalis capitis, obliquus capitis, multifidus and temporalis.**

CGH fact file - (J Am Osteopath Assoc. 2000)

1. Unilateral head or face pain without side-shift; the pain may occasionally be bilateral;
2. Pain localized to the occipital, frontal, temporal or orbital regions
3. Moderate to severe pain intensity;
4. Intermittent attacks of pain lasting hours to days, constant pain or constant pain with superimposed attacks of pain;

5. Pain is generally deep and non-throbbing; throbbing may occur when migraine attacks are superimposed (transformational);
6. Restricted active and passive neck range of motion; neck stiffness;
7. Head pain is triggered by neck movement, sustained or awkward neck postures; digital pressure to the suboccipital, C2, C3, or C4 regions or over the greater occipital nerve; valsalva, cough or sneeze might also trigger pain;
8. Associated signs and symptoms can be similar to typical migraine accompaniments including:
 - nausea; vomiting;
 - photophobia, phonophobia, dizziness;
 - others include ipsilateral blurred vision, lacrimation and conjunctival injection or ipsilateral neck, shoulder or arm pain

Migraine Headaches

Migraine is a neurological disease characterized by recurrent moderate to severe headaches. A migraine headache is described as a throbbing, pounding, or pulsating pain; it is often associated with specific and characteristic autonomic nervous system (ANS) symptoms. Typically, headache affects half of the head (hemicranial) but may occur on both sides or oscillate from side to side. Migraines last from 2 to 72 hours. The pain can be made worse by movement, coughing, straining, or flexing the head.

Associated symptoms may include nausea, vomiting, and sensitivity to light, sound, or smell. The pain is generally made worse by physical activity¹⁵. Up to one-third of people with migraine headaches perceive an aura: a transient visual, sensory, language, or motor disturbance that signals that the headache will soon occur (aura)¹⁶. A migraine without an aura (common migraine) may be preceded by mental fuzziness, mood changes, fatigue, and an unusual retention of fluids. Occasionally, an aura can occur with little or no headache following it.

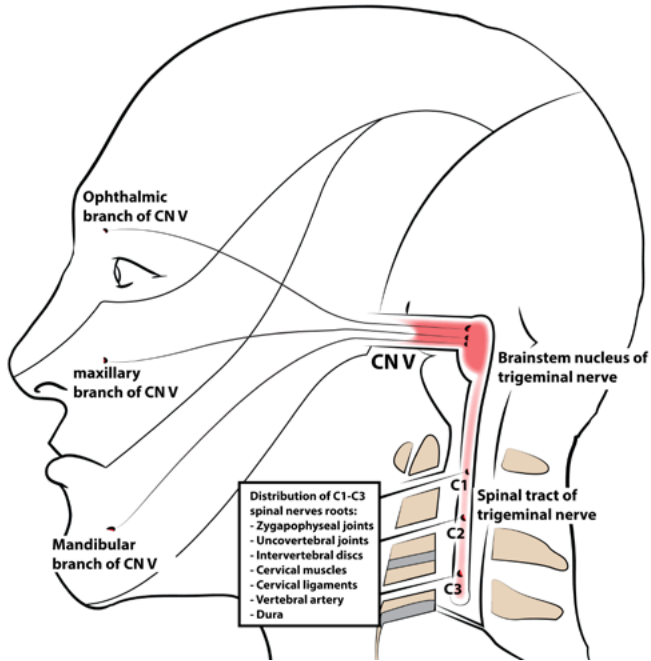
Causes of migraines

According to the ‘migraine trust’, the exact cause of migraine is not fully understood. Migraine has long been observed to run in families (about two-thirds of cases)¹⁷ so it is thought that there is a genetic component in migraine. Recent research has identified genes for rare types of migraine. People who get migraines may have abnormal genes that control the functions of certain brain cells. Current researcher is focused around the notion that people who have migraine have a hyper sensitive or ‘hyper-excitabile’ cortex as a result of aberrant neurones in the trigeminal cortex of the brainstem¹⁸. The implications are that the sensitivity threshold is lower in this group than the normal population. This degree of sensitivity is possibly genetically determined, influencing the threshold for triggering attacks. The trigeminal nerve is long and has a cervical branch that loops all the way down to C3. En-route the nerve puts out branches that supply the joints, discs, ligaments and arteries. It has been suggested that any of the structures in these areas as well as muscular trigger points in the region may contribute to this ‘input’.

Migraine symptoms are now thought to be due to abnormal changes in levels of substances that are naturally produced in the brain. Until fairly recently it was a commonly held view that an alteration in chemical substances such as serotonin and other vaso-stimulatory neurotransmitters affected the blood vessels in the brain (*vascular system input*), causing them to become inflamed and swollen, resulting in a migraines headaches. However, changes in blood vessels are now thought to be secondary to more important changes in brain chemistry.

Experts do know that people with migraines react to a variety of factors and events, called triggers. These triggers can vary from person to person and don’t always lead to migraine. A combination of triggers — not a single thing or event — is more likely to set off an attack. A person’s response to triggers also can vary from migraine to migraine.

Spinal Tract of the Trigeminal (V) Nerve Pathway



Frequently mentioned migraine triggers include:

- Lack of, or too much, sleep
- Skipped meals, getting hungry or not eating enough
- Bright lights, loud noises, or strong odors
- Hormone changes during the menstrual cycle
- Stress and anxiety or relaxation after stress
- Some weather changes
- Alcohol
- Caffeine (too much or withdrawal)
- Changes of routine and travel

The four stages of migraine

Typically migraines go through four distinct phases:

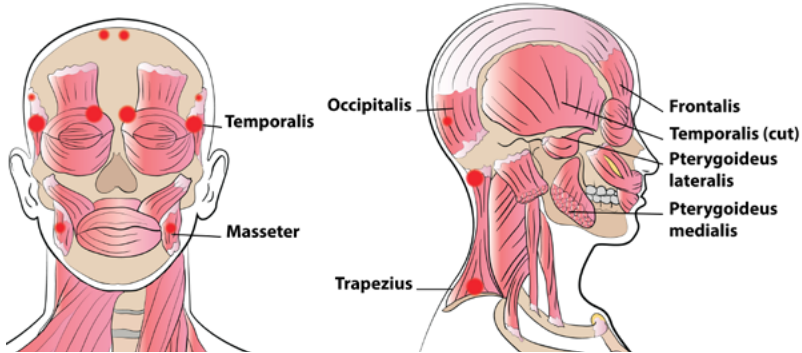
1. The prodrome, which occurs hours or days before the headache (60%)
2. The aura, which immediately precedes the headache visual disturbance (99%), sensory effects (50%) lasting for about an hour
3. The pain phase, also known as headache phase. Classically throbbing with moderate to severe pain and aggravated by physical activity. Frequently associated with nausea and vomiting, photophobia, phonophobia and sensitivity to smell. Swelling or tenderness of the scalp may occur as can neck stiffness.
4. The postdrome, the effects experienced following the end of a migraine attack. The effects of migraine may persist for some days after the main headache has ended. The patient may feel tired or 'hung over' and have head pain, cognitive difficulties, gastrointestinal symptoms, mood changes, and weakness

Trigger points and migraine headaches

A 2006 study by Calandre et al.¹⁹ compared patients at a headache clinic, who suffered from frequent migraines, with both non-clinic subjects with fewer migraine attacks and healthy control subjects who, at most, had infrequent tension headaches. The data was compelling and indicated that trigger points can lead to both peripheral and central sensitization as well as chronic tissue changes. These changes were directly proportional to the longevity and frequency of the migraine attacks.

They investigated the presence of trigger points and elicited referred pain in 98 migraine patients and in 32 healthy subjects. Trigger points were found in 93.9% migraines and in 29% of the control group. The number of individual migraine trigger points varied from zero to 14, and was found to be related to both the frequency of migraine attacks, and the duration of

the disease. About 74% of the total detected trigger points were found in **temporalis** and/or **suboccipital (obliquus capitis)** areas; other locations were mainly found in patients showing more than four trigger points such as the **orbicularis oculi** and **occipitofrontalis**. Trigger point palpation provoked a migraine attack in 30.6% patients.



Migraines, TTH, transformed headaches and trigger points

According to many neurologists, the most common form of headache seen in the clinic is 'chronic daily headache associated with muscle tension' (chronic TTH) **with periodic migrainous** features. This type of headache is often included in the category of migraine or **transformed migraine**, but is characterized by a background of daily headache with tender, tight muscle bands in the head, neck, and shoulder muscles (trigger points), with pain referred to the head²⁰. Trigger points are also thought to be 'input factors' as they make their host muscle shorter and less efficient and also have a role in both peripheral and central sensitization. This type of 'transformed headache' can often be reproduced by stimulating the trigger points that refer pain to the head (mainly the **temporalis, obliquus capitis, sternocleidomastoid** and **upper trapezius**).

Inactivation of the trigger points in these muscles can be an effective treatment in both the chronic and acute states. Furthermore, it has