

A MANUAL THERAPIST PERSPECTIVE ON HEADACHES

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Headaches are a commonly encountered pathology. A prevalence study found that 93% of men and 99% of women reported having some type of headache in their lifetime. They also reported the incidence of tension headache in men was 69% and in women 88%. Migraine headache incidence was 8% in men and 25% in women. (Rasmussen et al, 1991) Headache complaints resulted in over 12 million medical office visits and over 6 million medication prescriptions in the United States in 2009. (Noble, 2014) Manual therapy can be an effective alternative headache treatment. The manual practitioner should be aware of headache classifications, pathological physiology and research on manual therapy for headaches.

HEADACHE CLASSIFICATION

Headache classification is vast, with over 300 different headache types and etiologies reported by the American Headache Society. (AHS, 2015) In 1988, the International Headache Society released The International Classification of Headache Disorders. The original work, according to the preface, took three years and 12 subcommittees. The IHS guide is the most referenced headache work I encountered in researching headaches. The IHS is currently on their third edition, which is still in beta form. This paper uses IHS guidelines for classification purposes. (IHS, 2013)

PRIMARY HEADACHES

The most common headaches are listed as primary headaches. The primary headaches include migraine, tension, trigeminal autonomic cephalalgias. (TACs) and other primary.

Migraine headaches, while comprising 16% of headaches, involve 94% of all headache medical office visits. (AHS, 2015) Migraine symptoms consist of attacks lasting 4-72 hours. Migraine headaches are often unilateral, pulsating, aggravated by activity and moderate to severe in intensity. Migraines often involve nausea, vomiting, photophobia and phonophobia. Migraine headaches are often characterized by visual, smell or auditory sensory changes known as aura. Aura prodrome or postdrome, evolve gradually and are often dramatic. Aura usually involve visual symptoms such as photopia, metamorphopsia or scotomas. They can also produce aphasia, sensory, focal motor and brain stem affects. Aura are found in about 20% of all migraines and are sometimes referred to as classic. Common migraines make up the other 80%. An interesting migraine variant is the acephalgic migraine, which has aura without headache. Additional migraine variants include basilar migraine (vertigo, diplopia) and hemiplegic (familial) migraine. (Noble, 2014)

Tension headaches, while more common, involve only about 3% of office visits. (AHS, 2015) Tension headaches, like migraine, involve women three times more than men. (AHS, 2015; Noble, 2014) Tension headaches are typically bilateral, pressing or tightening (hat band). They are mild to moderate in intensity and are not aggravated by activity. (Noble, 2014)

Trigeminal Autonomic Cephalalgias (or TACs) will be a new addition to the I.H.S. classification. This heading replaces, but includes, cluster headaches. TACs include symptoms of laterally and autonomic involvement, including tearing, conjunctival injection, nasal congestion, runny nose, eyelid edema, forehead and facial sweating or flushing, ear fullness, pupil constriction or lid droop. **Cluster headaches**

are the most common TAC. Cluster headaches are more common in men (5:1), usually from 20-30 years of age. The symptoms are typically severe pain in the periorbital or temporal areas. The attacks last typically from 15 minutes to 3 hours, involve autonomic symptoms and follow a circadian pattern. Alcohol can provoke cluster headaches. (Noble, 2014) Another TAC headache is the **Paroxysmal Hemicrania** headache. These headaches are similar to clusters, but are more common to females. The attacks are typically shorter, lasting minutes, with more frequent attacks. They respond to the NSAID indomethacin, which is diagnostic of this headache. (Noble, 2014) **Hemicrania Continua** are another TAC headache. These are unilateral headaches that can last months. The pain is typically moderate, include autonomic involvement and they also respond to indomethacin. **Short-lasting unilateral neuralgiform headaches** (SUNA and SUNCT) are another TAC headache classification. These are similar to Paroxysmal, but with even shorter activity, lasting seconds to minutes. The pain is typically stabbing or sawtooth like. The headaches can either involve tearing with conjunctival injection (SUNCT) or autonomic symptoms (SUNA)

The other primary headaches include chronic daily headache, new daily persistent headache and medication overuse headache. **Chronic daily** headaches are usually a transformed migraine or tension headache. Medication overuse is often responsible for these headaches. **New daily persistent** headaches are a primary headache in early chronic illness development. (Noble, 2014) **Medication overuse** headaches (rebound headaches) are usually dull, diffuse and constant. These headaches can be moderate to severe, similar to migraine. They commonly involve caffeine, NSAID's and narcotics. The dosage does not have to be high to create this headache. (IHS, 2013; Noble, 2014)

SECONDARY HEADACHES

Secondary headaches occur in relation to some other disorder. To be considered a secondary headache, the headache must be attributable to one of the following. 1) A condition known to cause headache must be present. 2) Headache located close to the area of disorder. 3) Headache resolves shortly after the condition is corrected.

Head and Neck Trauma Headaches occur if trauma to the head or neck produce headache symptoms. These headaches include acute and chronic post traumatic headaches. This classification also includes whiplash, intracranial hematoma and post craniotomy. This is a crossover category that could include any headache attributed to an injury. Often the cause cannot be known for certain, until the injury heals. This criterion is complicated by chronic headaches that continue after the injury appears resolved.

Cranial and cervical vascular disorders often produce headache symptoms. These include stroke, subarachnoid hemorrhage, temporal arteritis, vascular malformations and venous sinus thrombosis.

Non-vascular disorder headaches include headaches related to increased intracranial pressure like pseudotumor cerebri. Other conditions associated with non-vascular headaches include non-infectious inflammatory disease, intracranial neoplasm, intrathecal injection and epileptic seizure.

Substance abuse and subsequent withdrawal can also cause headaches. These are also

considered primary headaches.

Infection headaches are headaches attributed to some type of infection, including intracerebral abscesses, meningoencephalitis and infection associated with the sinuses or orbital areas.

Disorders of homeostasis, which includes sleep apnea, arterial hypertension, hypothyroidism, fasting, cephalgia and other metabolic disorders, can also lead to headaches.

Headache or facial pain attributed to disorder of cranium, neck, eyes, ears, nose, sinuses, teeth, mouth or other structural disorders incorporates a larger class of cranial structural headaches. These headaches include some headaches related to the eyes, ears and nose that can be both structural and sensory. Temporomandibular joint related headaches are included here. Cervical structural or cervicogenic headaches are also included under this classification.

Psychiatric disorder headache is a crossover listing that includes any headache that is attributed to or manifests as a result of psychiatric conditions. . (IHS, 2013; Noble, 2014)

CRANIAL NEURALGIAS AND CENTRAL CAUSES OF FACIAL PAIN

Cranial neuralgias and central causes of facial pain are a third class of headaches listed by the International Headache Society. Pain in the head and neck region often are mediated by afferent nerve fibers of the trigeminal (CN V sensory-face and mouth), glossopharyngeal (CN IX, serving the throat and tongue), vagus (CN X, visceral sensory) and the intermediate nerve (parts of the facial CN VII and vestibulocochlear CN III). Also included are afferent fibers from the upper cervical roots via the occipital nerves. There are many headaches under this classification.

Trigeminal neuralgia headaches tend to be unilateral. The pain is short acting and shock like. The pain may be most common to the cheek and chin. This may be most noticeable in the nasolabial fold or chin area.

Glossopharyngeal neuralgia is characterized by a sharp, stabbing pain in the facial region. The areas affected include the ear, base of the tongue, tonsillar fossa or beneath the jaw. The pain follows both the vagus and glossopharyngeal nerve. The pain can be provoked by coughing, swallowing or talking. There is a wax and wane characteristic, much like trigeminal neuralgia.

Intermediate nerve neuralgia is a rare condition where pain is felt deep in the ear. Disorders of taste, lacrimation, and salivation can accompany the pain. There is some association with zoster activation.

Superior laryngeal neuralgia is another rare disorder characterized by severe pain in the lateral throat, underneath the ear or submandibular region. The condition seems precipitated by turning the head, shouting or swallowing.

Nasociliary neuralgia a rare condition that occurs when radiating facial pain is elicited by touching the outer nostril.

Supraorbital neuralgia is depicted by pain in the medial aspect of the forehead or supraorbital

notch. The pain is consistent with supraorbital nerve distribution.

OTHER TRIGEMINAL NERVE PAIN HEADACHES

Other trigeminal nerve pain headaches can be caused by entrapment or injury to trigeminal branches that are not previously described. **Occipital neuralgia** can mimic atlantoaxial joint pain and follows occipital nerve distribution. **Neck-tongue syndrome** is characterized by ipsilateral pain in the neck and abnormal sensation in the tongue. The pain distribution follows cervical and lingual nerves, corresponding to the pain. This can occur with subluxation of the atlantoaxial joint, compromising the C2 root. The sensation change in the tongue can be hypoesthesia or paraesthesia. **External compression headache** can occur from constriction of the cutaneous nerves. This constriction can occur from wearing a tight hat, goggles or head band. The pain can progress from mild to severe as the stimulus is prolonged. **Cold stimulus headache** describes a headache triggered by cold stimulus. Common examples of this are jumping into cold water or eating ice cream too quickly. **Cranial, cervical nerve compression, irritation or distortion headaches** are headaches or facial pain associated with afferent sensory nerves in the head or neck. This is a broad category that is commonly used to describe space occupying lesions in the head and neck. This can occur with tumors, aneurysm or osteomyelitis. **Optic neuritis** involves pain behind one or both eyes accompanied by decreased central vision. The event is caused by demyelination of the optic nerve. This condition is often associated with multiple sclerosis. **Ocular diabetic neuropathy** demonstrates pain around the eye or forehead. The condition has paresis of one or more cranial nerves, usually the third, in a diabetic patient. Pain onset is usually rapid, commonly affecting the nerves of the eye muscles. (CN3, CN4 and CN6) Neuropathy tends to develop a week or so after onset. **Herpes zoster head or neck pain** affects the trigeminal nerve in about 10% to 15% of patients with the disease. Herpes can also involve the geniculate ganglion affecting the auditory meatus. Ophthalmic herpes can involve CN 3, 4 and 6. The symptoms can involve facial palsies and acoustic problems that accompany the pain. **Tolosa-Hunt syndrome** is a condition that follows a similar pattern to herpes zoster neuralgia. CN 3, 4 and 6 can be affected with associated pain. The condition tends to resolve spontaneously, but can reoccur. Trigeminal involvement is often associated. The condition can be caused by cavernous sinus obstruction and can mimic tumors, vasculitis, meningitis, among others. This condition requires a good work up. **Ophthalmoplegic migraines** are recurrent headaches having typical migraine characteristics. These headaches involve cranial nerve paresis, without intracranial lesions. Cranial nerve three is typically involved and the headache often lasts a week or more. MRI studies suggest a demyelinating origin to this condition. Central facial pain can occur from other causes such as multiple sclerosis and post stroke. Painful trigeminal anaesthesia or hypaesthesia is found with **anesthesia dolorosa**. Pain and dryness in the mouth region are found in **burning mouth syndrome**. (IHS, 2013)

RED FLAG HEADACHES

Classification of headaches would not be complete without mention of “Red Flag” headaches. First or worst headache could indicate subarachnoid hemorrhage or CNS infection. Headaches that occur between 40 and 50 years of age (particularly over 50), with no prior history of headache, could indicate mass lesion or temporal arteritis. Progressive severity or frequency could indicate CNS lesion or subdural hematoma. Thunderclap headache is used to describe a sudden onset severe headache. Thunderclap headaches can occur with subarachnoid or other

intracranial hemorrhage, meningitis, sinus venous thrombosis, intracranial hypotension, CNS lesion, hypertensive crisis, pituitary apoplexy, angle closure glaucoma or arterial dissection. Provocative factors such as physical exertion or coughing can be suggestive of mass lesion or subarachnoid hemorrhage. Be cautious about any headache that exhibits a change in pattern, incapacitating severity, neurological or psychological changes, vertigo or vomiting, convulsions, weakness in extremities or difficulties in hearing, swallowing or balance. (Moses, 2012; AHS, 2015)

HEADACHE PATHOPHYSIOLOGY

The pathophysiology of headache pain is complex and still evolving. Secondary headaches have a related condition that is contributory and are therefore easier to understand. Primary headache pathophysiology is not so well understood. The areas of the head and neck that do have pain receptors (nociceptors) include the large veins, venous sinuses, extracranial arteries, middle meningeal artery, falx cerebri, cranial nerves, spinal nerves, muscles, meninges, parts of the brainstem, facial and mouth regions. (Greenberg et al, 2012) Cluster and migraine headaches are thought to begin in the brain as a neurologic dysfunction, followed by trigeminal nerve and cranial vessel involvement. Hyperactivity of the parasympathetic nervous system is often seen in cluster headaches. Tension headaches can follow a neurological path, similar to migraines. Tension headaches can also be the result of stress or over activity of precranial and pericranial nerves and muscles. Tension headaches can occur due to injury that involves flexion-extension injuries of the neck. Tension headaches can also occur due to poor posture or with jaw clenching. (Kunkel, 2015; Loder et al, 2008)

Migraines are often familial in pattern. It is thought that migraines might be due to an inherited tendency to have dysfunctional serotonin or neurotransmitter utilization. This can lead to hyperactivity of trigeminal function causing cranial vessels to release substances that cause dilation and inflammation. Inflammation of perivascular structures irritates nerve endings of the trigeminal nerve. This irritation sends signals back through the trigeminal pathways causing them to become sensitized. Once this central sensitization occurs, the nerve continues to fire. The scalp region becomes sore and sensitive to touch. Brainstem hypothalamus dysfunction is thought to account for nausea, photophobia and phonophobia. Cluster headaches follow a similar neuronal dysfunctional pattern, but are thought to involve primarily the hypothalamus. Increased internal carotid blood flow also occurs during cluster attacks. (Kunkel, 2015)

Previously, it had been proposed by Wolff, that migraine headaches had primarily a vascular cause. The proposed action was vasoconstriction, followed by vasodilation, provoking the headache phase. (Goadsby, 2009) The aura of migraine occurred during the vasoconstriction phase, the pain coming from activation of pain receptors during vasodilation. Studies have shown that extracranial vasodilation does not occur during migraine headache pain, only mild intracranial vasodilation. (Amin et al, 2013) The vascular theory does not appear to explain migraine headaches.

MANUAL THERAPY TREATMENT RESEARCH

The traditional medical model on headache treatment involves pharmaceuticals as the first line of treatment. A Norwegian study found that 47% of patients overused these medications. (Chaibi et

al, 2014) Medications often have potential side effects and are even implicated as the cause of medication overuse headaches. (IHS, 2013; Noble, 2014) The American headache society now recommends against opioid or butalbital-containing medications as first-line treatment for recurrent headache disorders. (AHS, 2015; Noble, 2014) The American headache society also recommends against prolonged or frequent use of over the counter medications for headaches. (AHS, 2015, Noble, 2014) Patients do not always tolerate medications due to side effects, heart disorders, asthma and other conditions. Medications may need to be avoided for other reasons as well. Alternatives to traditional pharmaceutical treatments should also be considered. These alternatives should include massage, physiotherapy, mobilization and chiropractic treatment. (Tuchin et al, 2011)

Massage therapy in Western cultures uses trigger points, classic massage, myofascial release, passive muscle stretching and other techniques applied to muscle tissue. Physiotherapy focuses on exercise and rehabilitation. Manual therapies emphasize postural corrections, soft tissue work, stretching, mobilization and manipulation. Mobilization is defined commonly as movement of the joints within the physiological range of motion. Mobilization can be active or passive. Chiropractic techniques commonly used are gonstead and diversified. Chiropractic spinal manipulation uses high velocity low amplitude thrusts, directed at the specific joint. The joint is moved just past the range of motion, without exceeding the physiological limit. Different practitioners use slightly different techniques in manual therapy. Manual treatment is therefore not as easy to compare as say a drug dosage. (Tuchin et al, 2011)

There have been several massage therapy studies done, evaluating the effectiveness of manual therapy on headaches. A Spanish study compared the effectiveness of manual therapy with ultrasound and found the massage group had a significant reduction in headache intensity compared to ultrasound. (Chaibi et al, 2014) An American study evaluated chronic migraine sufferers. Massage therapy reduced pain 71% compared to no reduction in the control group. A New Zealand study found migraine frequency was significantly reduced in the massage therapy group compared to the control group. This study also found significantly improved sleep quality in the massage group. (Tuchin et al, 2011)

Physiotherapy studies have been done comparing the effectiveness of manual treatment on chronic tension-type headaches. The review looked at American, Turkish, Danish and Dutch studies. Three of the randomized controlled trial studies had 54%, 82% and 85% participants reporting $\geq 50\%$ reduction in post treatment. This effect was maintained in two of the studies that had a six month follow up. The results compared favorably to the medication control group that used tricyclic antidepressants. The manual therapy group required more consultations, but the drug group had more medication related side effects. Two of the studies assessed the headache index (frequency x intensity). Both studies showed a significant improvement post treatment at one and six months. Four of the studies' participants had a mean of 10.1 years of headaches. The improvement was therefore likely to be therapeutic rather than spontaneous. (Chaibi et al, 2014)

An Australian study compared cervical mobilization and manipulation on migraine headaches. Chiropractor and physiotherapists were used in the study. Improvement was found in both treatments, by both groups. Twenty month follow up showed further improvement in both groups. (Tuchin et al, 2011)

A Dutch clinical study was done to evaluate the effectiveness of manual therapy, compared to usual care by general medical practitioners. The manual therapist used mobilization, exercises and postural corrections. The medical practitioners used standard treatment methods, including lifestyle and medications. The study found a significantly larger reduction in headache frequency for the manual therapy group. Disability and cervical function showed significant improvement for the manual therapy group at 8 weeks, but not significantly different at 26 weeks. (Castien et al, 2009)

A Spanish study compared the effectiveness of soft tissue therapy, occipitAtlas-axis manipulation and a combination of the two for tension-type headache. The study found a significant improvement with manipulation and with the combination of the two. The combination group had the greatest improvement, showing that a combination of the two treatments was better than either alone. The combination group demonstrated reduced headache impact, disability, frequency, intensity and pericranial tenderness. Additionally, the combination group showed increased flexion and extension. (Espí et al, 2014)

CONCLUSION

Headaches are a common medical problem and a contributory cause of medical disability. The most commonly encountered headaches are the primary headaches. The most common primary headaches are tension and migraine. Migraine headaches are the most common headache seeking primary care treatment. The pathophysiology of headaches is not completely understood, but seems to involve a complex vascular, nerve and mediator interaction. Traditionally, first line treatments for primary headaches involve medications. Medications have the potential for side effects and can even cause primary headaches if over used. In an environment of rising medical costs, appropriate alternative therapies for medical conditions should be considered. Manual therapy provides an effective alternative to traditional primary headache treatment, without drug risks or cost. Manual therapy includes soft tissue, mobilization and manipulation. Studies have shown that these treatments are equal to, and sometimes more effective than, traditional therapies for the major primary headaches.

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