Review

Multidisciplinary team approach to headache care

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Practice Points

- So-called refractory headache patients may be difficult to treat but are far from intractable.
- Most patients referred to headache clinics are chronic at admission.
- Between 20 and 25% of clinical headache patients suffer from medication overuse headache.
- Detoxification of patients with medication overuse headache is very effective.
- Multidisciplinary approach is valuable and cost effective.
- Detoxification of medication overuse headache can be succesfully conducted in outpatient groups.

SUMMARY Most patients with chronic headache are severely affected and characterized as refractory to treatment. The individual and societal burden of chronic headache is very high. Pharmacological treatment may be insufficient and is often associated with side effects so other aspects of pain management are often required. In recent years, international guidelines for multidisciplinary treatment of headache have been introduced and many headache centers have successfully included these elements in their treatment strategies. Evidence for the effect of such integrated headache care is now accumulating and a review of the existing literature is presented here.

In a global perspective, as many as 50% of the general adult population are affected with headache [1–3] and the most common primary headache disorders, migraine and tension-type headache, cause substantial levels of disability and remain under-recognized and undertreated [4–7]. As increasing headache frequency often leads to chronic headache, which is by definition headache on 15 days or more per month [6], patients with frequent headaches ought to be identified at an early stage, and referred to specialists for optimized headache care. If we can identify the individuals at risk and prevent the chronification, much suffering can be avoided and important knowledge can be collected. At present, 4–5% of the entire population suffer

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from chronic headaches and the need for specialist evaluation and care is tremendous [1,2,7,8]. The majority of patients referred to specialized centers are already chronic at admission [7], may have suffered from headaches for decades and may be refractory or difficult to treat. Multiple pharmacological strategies have already been explored before and are either not effective or are associated with unacceptable side effects. An analysis from the Danish Headache Center, a specialized national center, revealed that 55% of new patients were chronic at the time of referral, had suffered from headache for an average of 17.4 years and had been referred to a high number of specialists and pharmacological, as well as nonpharmacological, trials [7,8]. In line with other studies, the need for improved strategies for prevention and treatment was highlighted. Furthermore, frequent headache also includes the risk of frequent intake of triptans, simple analgesics or combination drugs containing opioids or caffeine resulting in medication overuse headache (MOH), a well known but in principle treatable complication in headache [9–12]. The pattern of overuse may differ significantly between countries but, overall, patients' knowledge about headache, medication and other treatment strategies is often poor and may lead to wrong conceptions of disease and insufficient outcome. A study of patients' expectations to treatment in three European countries revealed that 51% expected their headache to be cured, and 71 and 57%, respectively, requested effective prevention and fast relief of the headache episodes [13]. A total of 64% expected information about self-management and 52% expected to receive education on their headaches [13]. Patient education in nonpharmacological prevention may therefore be valuable, and may also prevent chronification and medication overuse.

Unfortunately, the possibilities for providing severely affected patients with information and instructions are very limited in many settings and countries, mainly owing to the lack of knowledge, resources and evidence.

Patients in headache centers may also be suffering from comorbidity and may present a high degree of complexity. Thus, additional strategies for these complex patients are urgently needed. Secondary or tertiary care for headache is marked by diversity of required professional expertise. An interdisciplinary approach is often recommended and considered to be highly relevant in providing chronic and often refractory headache patients with appropriate therapeutic care [7,12,14,15]. Depending on existing healthcare systems (their geography and organization), inpatient service may be established for severely affected individuals, whereas outpatient service is usually offered as first-line management to headache patients in most settings. Randomized controlled studies comparing inpatient and outpatient service are lacking and this article describes current literature without such a separation.

Clinicians specializing in the general area of pain have long recognized that the treatment of chronic pain requires the coordinated action of several disciplines, including pain physicians, behavioral psychologists, psychiatrists, physical therapists and social workers. Most pain centers at academic and large, nonacademic hospitals work according to this principle.

Establishing a multidisciplinary treatment program may therefore be one step towards optimized care and prevention. According to the European Headache Federation, headache service should be organized in a three-level system reaching from primary headache care to headache clinics and academic headache centers [14,15].

However, scientific evidence for these multidisciplinary headache clinics and evaluations of their cost–effectiveness become a pertinent challenge. This article aims to cover existing knowledge on the treatment strategies and the assessment of outcome for multidisciplinary care. Furthermore, it is also aimed at providing some ideas for the future analysis of outcome and strategy.

What is a multidisciplinary headache center?

The major aims of multidisciplinary treatment programs are to inform and educate patients better in handling headache and to improve therapy in order to reduce headache frequency and enhance quality of life. Integrated treatment programs have been developed and implemented in the USA and northern Europe for patients with frequent or so-called refractory headaches [7,12,16–20]. The concept includes multidisciplinary therapy provided by a team of neurologists, behavioral and clinical psychologists, physical and sports therapists and headache nurses **(Figure 1)**, supplemented by consultants from psychosomatic medicine, psychiatry and dentistry if needed. To enhance the quality of headache treatment, multidisciplinary treatment should be based on teamwork among the different

disciplines involved, instead of only compiling the concepts from each individual neurologist, psychologist and physical therapist. Which elements of such multidisciplinary approaches are truly relevant and which combinations of treatment strategies should be applied are yet to be established. An overview of published concepts for multidisciplinary treatment has recently been published [16,19] and strategies from five different centers have been presented by Diener *et al.* [20]. An important step towards clarifying and promoting the collaboration between the professions was taken at the European Headache and Migraine Trust International Congress 2010 (EHMTIC 2010) in Nice, France, where a specific symposium for multidisciplinary headache management was organized [16]. Lifting the Burden also organized and established an international forum for headache nurses during this meeting. Similar professional forums for the other team members within the headache field are important to nourish the growing interest and organizational activities.

Guidelines for the organization of headache clinics have recently been created by a subcommittee from the European Headache Federation (EHF) [14,15] and, likewise, Accreditation for International Headache Centers from the International Headache Society is ready to be published. These pioneering guidelines are awaiting national implementation but must be regarded as a significant step towards global headache care. In most countries in Europe, headache care is organized into three different levels:

- Level one – primary care and led by general practioners;
- Level two – a headache clinic with one or two neurological specialists or a general practioner with a specific interest in and knowledge about headache;
- Level three – an Academic Headache Center with headache specialists, multidisciplinary treatment strategies and continuous scientific activities.

This review focuses primarily on level three, the multidisciplinary headache service [14,15]. Detailed evaluation of the value and the implementation of these guidelines remains to be published but overall they are believed to be helpful for the patients, for society and national organizations and lead to subsequent improvements in overall headache care.

Controlled studies to document the effect and cost–benefit of multidisciplinary treatment can be resource and time demanding and are not yet available.

Which patients should be referred to a multidisciplinary team?

In the EHF–Lifting the Burden guidelines, a detailed list of patients that should be considered relevant for a multidisciplinary headache center was proposed **(Box 1)**, and patients with chronic headaches, patients with rare headache disorders such as cluster headaches and other TACS, trigeminal and other cranial neuralgias should be referred to specialist care **(Box 1)**. In particular, the first group with chronic, so-called refractory headaches is relevant for the multidisciplinary team approach as they may have failed multiple prior treatment attempts and demonstrate a very severe impact on their daily living.

It was also recommended that level three headache care requires full-time inpatient facilities, multidisciplinary management and access to equipment and interdisciplinary collaboration

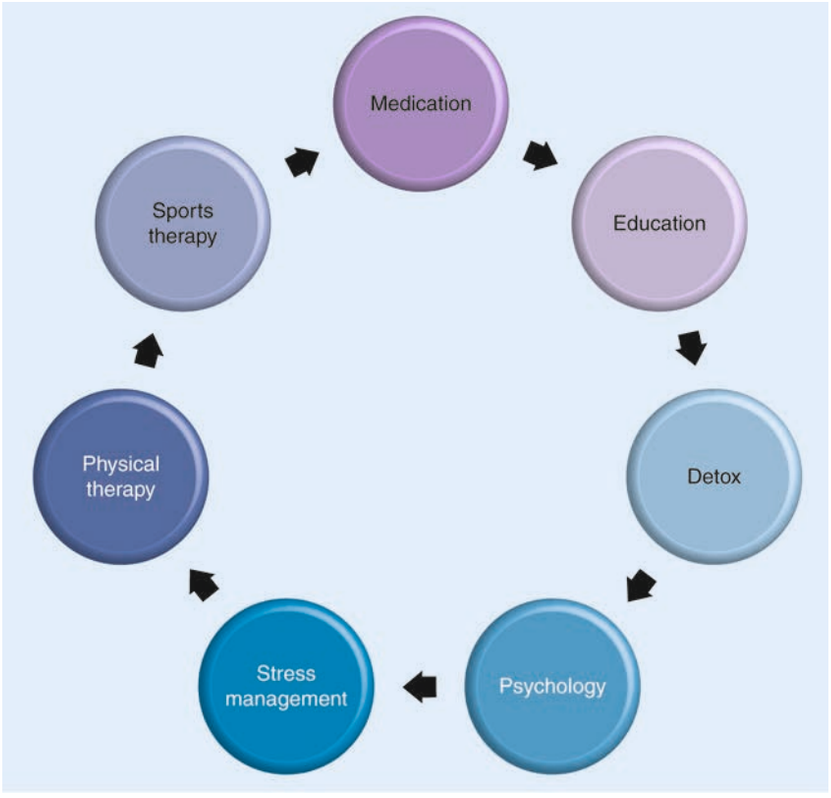

Figure 1. Examples of relevant elements of a multidisciplinary approach for complex headache patients.

with specialists in other disciplines for diagnosis and management of the underlying causes of all secondary headache disorders.

What are the elements of a multidisciplinary headache center?

The neurologist, the pain specialist or the general practioner with a specific interest in headache is usually the leading figure in most headache centers and should be responsible for establishing the correct headache diagnoses according to International Classification of Headache Disorder (ICHD)-II [6] and developing therapy plans in close collaboration with the patient and the team members. A clinical neurological examination should be performed in all patients, supplemented by diagnostic tools to exclude secondary headache if necessary. Ideally, the neurologist should then inform the patient about the diagnosis and possible triggering and aggravating factors. Thereafter, an individual plan tailored for acute treatment, for prophylactic treatment (if required) and preferably based on national and international guidelines should be generated and explained to the patient. In general, neurologists are most accepted by the patient for diagnosis and pharmacological strategies, whereas the planning of optimal nonpharmacological management may include careful evaluation and a close collaboration among the entire team and the patient **(Figure 1)**.

Physical & sports therapy

Neck pain is a very common and prominent symptom in most headache patients [21–24] and probably closely related to the pathophysiological mechanisms of most primary headache disorders. Because of this coexistence with neck pain, physical therapy treatments are very often prescribed, at least in Europe [7,12,21,22,25]. Physical therapists are trained to recognize whether disorders of the musculoskeletal system contribute to a patient's symptoms. This is carried out by collecting a detailed history from the patient and by conducting a clinical examination of the cervical spine and the masticatory system to detect possible aggravating factors (in primary headache) or causative factors (in secondary headache). An active treatment strategy including a physical exercise program may also play an important role in the general health of a patient and thus indirectly in the prevention of chronification of headache. The main goal of physical therapy treatments in migraine and tension-type headache patients is thus the prevention of headache episodes rather than the alleviation of symptoms once an attack has begun [21,22,25].

Nowadays, active participation of the patient is considered essential for treatment success [22], and the single use of passive interventions (e.g., massage or physical modalities) remains undocumented and is no longer considered as 'best practice'.

The number of high-quality studies on the effect of physical therapy on these headaches is fairly limited and few evidence-supported treatment recommendations exist [22,25,26,101]. By contrast, there is strong evidence to suggest that various types of relaxation training (e.g., thermal/EMG biofeedback) may be effective treatments for the prevention of migraine [25–28].

In clinical practice, physical therapy is combined with preventive drug therapy for both migraine and tension-type headache but there is only evidence to support a combination of relaxation training with preventive drug therapy (i.e., propranolol and amitriptyline) to achieve additional improvement in migraine relief [28]. Similar high-quality studies are lacking in tension-type headache although the effect in these patients may be even better.

Aerobic exercises are reported to be effective in improving quality of life [21,27], whereas it was also reported that the effect of physical exercise was similar to the prophylactic effect of topiramate in a recent, well-designed study in migraine by Varkey *et al.* [29].

Box 1. Patients that are recommended to be referred to multidisciplinary care.

- Refractory disabling headache of any type
- Chronic migraine
- Chronic cluster headache
- Cases of persisting headache with diagnostic uncertainty
- Other cases of probable or certain serious secondary headache
- Medication overuse headache involving drugs of dependence, where personality mitigates against withdrawal of medication or where withdrawal attempts have failed
- Headaches with severe physical and/or psychological comorbidities

Although controversial in physical therapy, there is limited evidence for the short-term effect of cervical spinal manipulation of migraine and tension-type headache. Physical therapists may also play an important role in the treatment of patients with secondary headaches and especially those related to a disorder of the musculoskeletal system; "headaches attributed to head/neck trauma, cervicogenic headache, or headache or facial pain attributed to a disorder of the temporomandibular joint" (defined in the ICHD-II) [6], but evidence for this is sparse.

At present, we can conclude that physical therapy and physical training may be important supplements to the multidisciplinary approach, especially in patients with chronic TTH, episodic or chronic migraine and probably also in patients with secondary headaches. However, there is still a need to investigate the role of physical therapy in the multidisciplinary team and to identify essential elements of physical therapy.

Headache nurses

In recent decades, the role of the specialist nurse has developed rapidly across specialities but differs markedly across countries [30,31]. In general, an international trend is evolving to move nurses' training into an academic discipline, focusing on nursing research. Integrating nurses into headache care is increasingly regarded as an important step towards improving outcomes for patients through improved access to services and optimizing the consultation time with the neurologist or headache specialist. For example, in the UK, Ireland and Denmark there are more than 20 headache nurses, who work within neurology services, and a large proportion of patients in these services will have independent nurse-led care following their initial diagnostic medical consultation. The number of nurses may increase as new services develop and the impact of the nurses' contribution is recognized as a crucial component of such services. Similarly, headache specialist nurses are emerging in many other European countries and the newly established International Forum of Headache Nurses (IFHN) may thus play a role in facilitating service developments, standardizing authorization of specialist nurse practioners, education programs and initiating nurse-related research.

The specialist nurse may also be involved in conducting or participating in clinical research and audits as well as planning for changes in patient care delivery based on experience and research. Ultimately, the nursing contribution will become more significant and visible in headache care as services develop and it will probably reflect the care already provided in established multidisciplinary headache clinics [7,11,16,19,20].

The main activities undertaken by the specialist nurse include patient consultations to monitor their progress at regular intervals during follow-up. This includes follow-up to medical outpatient consultations or inpatient episodes, monitoring drug efficacy and tolerability, supporting patients with treatment changes and addressing patients' queries. In many settings, specialist nurses will take or supplement the headache history, assess the level of disability, provide and collect headache diaries and provide support and advice in the headache clinic. In the outpatient clinic, the nurse will also advise on lifestyle issues, trigger factors, use of medication, change of medication or withdrawal from overused analgesics. In the Danish Headache Center, where 20–25% of newly referred patients suffer from MOH, the specialist nurses organize and conduct the 'headache school', which is a specific detoxification program for MOH patients in small groups [7,12]. This program has the aim of supporting and guiding patients during a 2-month period to prevent recurrence of drug overuse. The overall goal of the headache school is to qualify the patients themselves as experts for their own headaches. Close follow-up within the headache school concept may also increase motivation. It is our impression that group sessions are valuable for the patients and very suitable with regards to cost–effectiveness and resource demand but evidence is needed.

So far, evidence for headache schools is accumulating and similar strategies are widely used and accepted in other chronic disorders such as ischemic heart diseases, diabetes and stroke [32].

Overall, specialist nursing activities are likely to improve both the patient's experience and clinical organization because they affect all relevant areas of service delivery. Specialist nurses are often regarded as the most important team players in the multidisciplinary headache team [7,11,31].

Psychologists

Psychiatric comorbidities are well known in headache patients and the combination of anxiety and depression was reported in approximately 20% of patients in a tertiary headache

center in France [33]. Chronic tension-type headache, chronic migraine and MOH seem to have the highest rates of psychiatric comorbidity (78, 64 and 68%, respectively) [34–36], but may also represent the best-studied groups owing to their high prevalence. However, looking at the involvement of psychological factors in headache, we are faced with a lot of different dimensions: from life events to psychological trigger factors, from stress to personality characteristics. As there is a close connection between headache and other pain disorders and patients' psychological health and quality of life, psychologists play an important role in the evaluation of headache patients as well as in therapy. Psychological intervention should not only be considered if psychopathology has been diagnosed as other psychological mechanisms may also represent a risk for headache chronification [37]. Furthermore, education and self-management are important to all patients with headache and therefore are an important part of the treatment that can be carried out by psychologists. This includes lifestyle education, self-management, handling medication and risks of medication overuse, as mentioned above. Even though detailed scientific data are sparse, psychologists are also considered as important members of multidisciplinary teams. Nonpharmacological treatments are acknowledged as preventive methods especially for migraine and tension-type headache according to neurological guidelines [38,39]. The efficacy of biofeedback in primary headache is well documented and without side effects [38–40], and in most settings is applied by the psychologist. Psycho-physiological (relaxation often utilized with biofeedback) and cognitive-behavioral training are thus the core methods of this approach [40–43]. These methods, usually offered in eight to 12 group-based treatment sessions, can be combined, condensed to home-based training and otherwise transformed into self-management formats. Such self-management training achieves 42% responders regarding migraine attack prevention [40–43]. Furthermore, marked increase in perceived control over and self-confidence in attack prevention and improved migraine-specific quality of life over time were also reported when training was offered by dedicated patient trainers under supervision of psychologists. Essential psychological issues include also self-efficacy, perceived control and catastrophizing, and the patient's readiness to change and avoidance should be considered [44–46]. Self-efficacy mediates successful headache management and is related to perceived own control over headache [40–46]. The focus should be on active management and coping and not only on avoidance of headache triggers.

Other players in the headache team

Depending on cultural and organizational traditions, many other players may be included in the headache team. In Germany, sports medicine is considered to be very important whereas in Scandinavia these functions are covered by the physical therapists. In the Danish Headache Center, a psychiatrist is consulting once a week in screening for eventual comorbidities and their management for all the inpatients and selected outpatients. Similarly, a dentist with specific expertise in TMD and occlusions is consulting once a month for selected patients and a gynecologist with specific interest in menstrual migraine is employed for relevant selected patients. A close collaboration with other named specialists within the local setting and hospital organization is usually a very useful addition to the case of complex headache patients, especially within neuroradiology, ophthalmology, pediatrics and anesthesiology depending on local resources and organizations [7].

Organization & follow-up

Continuous follow-up after the initial diagnosis and initiation of a multidisciplinary treatment plan can also be recommended for improving the outcome. Adjustment of prophylactic and acute treatment is necessary in the vast majority of patients and usually four to five follow-up visits are needed [7,11,19,47]. Specific treatment programs are usually directed towards the major diagnostic subgroups in order to improve cost–benefit for patients but the underlying evidence is scarce. A pilot study – group model at Kaiser Permanente – of outcome from a center of excellence for headache care has been published [17] and is based on educational lessons by neurologists and nurse practitioners. A significant improvement was accomplished in 92% of patients after completion of the program at 8 weeks and maintained after 6 months. Patient visits to primary care and emergency departments regarding headaches decreased significantly and high levels of satisfaction from primary care physicians were

also achieved [17]. In most specialized clinics, 20–50% of the patients suffer from MOH and dedicated programs are also initiated with group lessons focusing on detoxification with success and a highly significant reduction in headache frequency with 50% for patients with tension-type headache and 76% for those with migraine [7,11]. More than 70% of those with chronic headaches reverse to an episodic pattern after detoxification and it is the subgroup referred with chronic migraine and medication overuse in particular who are very rewarding to detoxify. More detailed evaluation of the efficacy and the ideal composition of the multidisciplinary treatment strategies are highly requested.

Patients with chronic or difficult-to-treat headaches may be complex and are often suffering from comorbidities. Most patients are generally referred to a headache specialist for evaluation and advice but a favorable outcome may be difficult to achieve in these complex patients. Medical prophylaxis alone is only effective in approximately half of the headache patients and additional strategies are urgently needed [19,45].

An attractive alternative is the multidisciplinary headache center, where care is provided by different disciplines (neurology, behavioral psychology, psychiatry, headache nurses, physical therapy and sports therapy) across sectors of the healthcare system involving outpatient and inpatient care and treatment. This review summarizes the existing guidelines and experiences in integrated headache care settings and debates future perspectives.

Conclusion & future perspective

The global recognition of headache as a major burden of public health underlines the need for improved headache care treatment and organization. Increased awareness and education in headache medicine are therefore very important issues for future generations of medical professionals. Further progress and detailed documentation for the multidisciplinary management of complex headache patients are highly requested, along with public information and prevention for the majority of headache sufferers.

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