



**Clinical Commissioning  
Policy: Occipital Nerve  
Stimulation for adults with  
intractable chronic migraines  
and medically refractory  
chronic cluster<sup>1</sup> headaches.**

# **Clinical Commissioning Policy: Occipital Nerve Stimulation for adults with intractable chronic migraines and medically refractory chronic cluster headaches**

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Specialised Pain**

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## **Policy Statement**

NHS England will commission Occipital Nerve Stimulation (ONS) as a treatment for adult patients with chronic migraine or chronic cluster headaches who have failed to respond to available pharmaceutical treatments, in accordance with the criteria outlined in this document.

In creating this policy NHS England has reviewed this clinical condition and the options for its treatment. It has considered the place of this treatment in current clinical practice, whether scientific research has shown the treatment to be of benefit to patients, (including how any benefit is balanced against possible risks) and whether its use represents the best use of NHS resources.

This policy document outlines the arrangements for funding of this treatment for the population in England.

## **Equality Statement**

Throughout the production of this document, due regard has been given to eliminate discrimination, harassment and victimisation, to advance equality of opportunity, and to foster good relations between people who share a relevant protected characteristic (as cited in under the Equality Act 2010) and those who do not share it.

## **Plain Language Summary**

Intractable chronic migraine is a chronic disabling disorder characterised by recurrent moderate to severe headaches often accompanied by nausea, vomiting and sensitivity to light, sound or smell. Cluster headaches are very painful highly incapacitating headaches that present in bouts usually once or twice a year lasting for approximately one to three months; they tend to be unilateral, more common in men and a proportion of them are intractable with existing medication.

Occipital Nerve Stimulation (ONS), also known as Peripheral Nerve Stimulation of the Occipital Nerves, is a procedure that has proven to be effective in treating the pain associated with refractory chronic migraine and chronic cluster headaches. The procedure involves the delivery of mild electrical pulses to the occipital nerves that are located just beneath the skin in the back of the head. A small electrical lead or leads are placed under the skin and connected to the neurostimulator, which produces the pulses of stimulation.

Information on the outcomes of treatment for these patients will be collected and considered when this policy is reviewed.

## 1. Introduction

Headaches are one of the most common neurological complaints presented to GPs and neurologists in England; they are painful and debilitating, and represent an important cause of absenteeism from work or school and a substantial burden to the healthcare system and society (NICE CG150, 2012). Most headaches can be managed in non-specialised services; however, in a small sub-group of patients conventional therapies do not control the symptoms resulting in significant levels of distress and disability with serious negative impact on patients' quality of life and ability to contribute to family and society. These patients need to be under the care of specialised headache services with multidisciplinary and multi-speciality input.

Migraines are moderate to severe pulsating or throbbing headaches that can present with or without an aura (visual, sensory, motor, speech, brainstem or retinal symptoms), accompanied by other symptoms such as increased sensitivity to light and/or sound, nausea and/or vomiting, and aggravation by routine physical activity and can last from 4 to 72 hours in adults. Chronic migraines are highly debilitating migraines that present for more than 15 days per month and for more than 3 consecutive months (NICE, 2012).

Cluster headaches are some of the most painful highly incapacitating primary headaches; they are usually strictly unilateral and accompanied by cranial autonomic symptoms such as redness or watery eye (on the same side of the headache); nasal congestion, swollen eyelid; facial sweating or flushing, sensation of fullness in the ear, constricted pupil or droopy eyelid. Patients feel restless and agitated during attacks. They can last from 15 minutes to up to 3 hours (NICE, 2012) and occur with a frequency ranging from one every other day to 8 headaches daily. Between 10 to 20% have a chronic variant (Magis et al, 2011), with daily or near daily attacks and less than a month continuous remission in a 12 month period.

Adequate management of these conditions will significantly improve health outcomes, quality of life and considerably reduce disability, time lost to school or work and the economic burden to society and the health care.

There is increasing evidence that ONS is an effective procedure to manage chronic migraine and chronic cluster headaches in those patients that are refractory to other available forms of treatment. ONS involves subcutaneous placement of multi-contact electrodes to cover the region of the greater and lesser occipital nerves and tunnelling the electrodes to a subcutaneous pacemaker usually positioned below the collar bone (clavicle).

## 2. Definitions

**Migraine** according to the Headache Classification Subcommittee of The International Headache Society (2013), is a recurrent headache disorder manifesting in attacks lasting 4-72 hours. Typical characteristics of the headache

are unilateral location, pulsating quality, moderate or severe intensity, aggravation by routine physical activity and association with nausea and/or photophobia and phonophobia. Some patients have fully reversible visual, sensory or other central nervous system symptoms that usually develop gradually and are usually followed by headache and associated migraine symptoms.

**Intractable Chronic Migraine (ICM)** occurrence of headaches lasting a minimum of 4 hours per day in 15 or more days per month for more than three months causing moderate to severe disability in patients with migraine with well documented evidence of failure to benefit significantly from at least 4 of 5 classes of oral preventatives used routinely in practice for migraine treatment and documented failure to respond to acupuncture (NICE 2012) and Cranial Botulinum Toxin as defined by NICE TA 260 (2012). The five classes of oral preventative agents include (a) beta-blockers; (b) anticonvulsants - (topiramate, sodium valproate); (c) tricyclic anti-depressants; (d) serotonergic modulators (methysergide, pizotifen), and (e) angiotensin receptor blockers. These 4 classes must include beta-blockers and anticonvulsants (as outlined by NICE CG 150). An adequate trial is defined as a period of time during which an appropriate dose of medication is administered, typically at least 2 months at optimal or maximum-tolerated dose, unless terminated early due to adverse effects.

**Cluster headaches** according to the Headache Classification Subcommittee of The International Headache Society (2013), are very painful highly incapacitating primary headaches; they present as attacks of severe, strictly unilateral pain which is orbital, supraorbital, or temporal, lasting 15–180 minutes and occurring from once every other day to eight times a day. The pain is associated with ipsilateral conjunctival injection, lacrimation, nasal congestion, rhinorrhoea, forehead and facial sweating, miosis, ptosis and/or eyelid oedema, and/or with restlessness or agitation.

**Chronic Cluster Headaches (CCH)** Approximately 10-20% of cluster headaches are chronic with attacks occurring for more than 1 year without remission, or with remission periods lasting less than 1 month (Headache Classification Subcommittee of The International Headache Society, 2013).

**Occipital Nerve Stimulation (ONS)** involves implantation of a battery-powered pulse generator under the skin. A wire tunnelled under the skin is connected to the occipital nerve. Parameters (such as pulse width and frequency, current intensity and on/off cycles) can be programmed into the pulse generator using a programming wand. At any time additional stimulation can be applied or the device can be turned off. The battery is sufficient for about 3 to 8 years (median life is 5-6 years) and can be replaced under local anaesthesia.

### 3. Aim and objectives

This policy aims to outline the criteria under which ONS will be commissioned by NHS England for adults with intractable chronic migraines and medically refractory chronic cluster headaches.

The objectives are to provide an evidenced based alternative treatment for this highly selected group of patients that do not respond to other existing therapies.

### 4. Epidemiology and needs assessment

Headaches are amongst the commonest reasons for consultation to primary care and neurology services in England (NICE 2012). Severe headaches such as intractable migraine and chronic cluster headaches have a debilitating effect on patients and often result in severe functional impairment, the 2010 Global Burden of Disease Study conducted by the World Health Organisation (Vos et al. 2012), estimated the worldwide prevalence of migraine at 14.7% (the third most common disease); migraine rated seventh as specific cause of disability at the top of all other neurological conditions. The World Health Organisation stated that a day with migraine is considered to be as disabling as a day with quadriplegia, psychosis or dementia (WHO 2011).

A recent systematic review of the epidemiology of headache in Europe (Stovner and Andree, 2010) identified that over 50% of adults reported suffering from headache in the previous year; and when questioned specifically about tension-type headaches, approximately 60% reported symptoms in the previous year; the estimated lifetime prevalence of migraine was 15% and of cluster headache 0.2-0.3%.

Olesen (2011) estimated that migraine is one of the most common neurological conditions, with a lifetime prevalence between 15 and 20%; according to The Department of Health (2005) in the UK, migraine affects approximately 8 million people and Steiner et al (2003) estimated that every day around 190,000 people in England would have a migraine attack, and more than 100,000 would be absent from work or school as a result of it. Chronic migraine is a debilitating condition that affects approximately 2% of the population, medically refractory chronic migraine rarer still, resulting in significant disability, economic burden, and impairments in quality of life (Tavanaiepour and Levy, 2014).

Cluster headache has a prevalence of 0.2% but chronic cluster headache has a much lower prevalence of 0.01%. (Russell, 2004). The majority of these cases will be effectively managed with medical treatment but a significant minority will prove medically refractory. Unfortunately, there are no population studies available to allow quantification of this population. Cluster headache is a highly disabling condition; it is referred to as one of the most painful conditions known to man, with female sufferers often stating the pain is comparable to that of child birth. The United States Cluster Headache Survey found 55% of sufferers admitting to suicidal

thoughts and 8% unemployed or on disability benefits due to their cluster headaches (Rozen and Fishman, 2012).

The cost of headache disorders is high. A cross sectional survey in eight European countries estimated the total annual cost of headache in adults in the EU at €173 billion with migraine representing 64% of the burden (€111 billion) followed by medication overuse (21%) and tension type headache (12%) and concluded that headache disorders are prominent health-related drivers of immense economic losses for the EU (Linde et al, 2012). This has immediate implications for healthcare policy; innovative management of chronic debilitating headaches can significantly improve quality of life and reduce the socioeconomic burden.

Most patients with chronic headaches disorders can be managed by primary and secondary care and do not need the skills of specialised Headache Services. A specialist London headache service and one of the main centres for ONS referrals had inserted 165 implants between 2007 and 2013, this averages at an insertion rate below 30 systems a year.

## 5. Evidence base

Intractable chronic migraine (ICM) and refractory chronic cluster headache (CCH) are highly disabling conditions that are resistant to conservative treatments. Occipital nerve stimulation (ONS) may be an effective treatment for chronic refractory headache disorders. The evidence base on its clinical effectiveness, safety and cost-effectiveness is presented below for these two indications.

Trials of preventive treatments in headache disorders had traditionally used a 50% responder rate. However, there has been significant progress in identification of the appropriate outcome measures in chronic pain, as well as improved understanding of clinically meaningful changes. Recently, both the IMMPACT (Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials) panel and the International Headache Society (IHS) have established a 30% reduction in pain as clinically meaningful (Silberstein et al, 2008; Dworkin et al 2008 and 2010). The clinical trials described below were designed when the accepted standard for pain reduction was 50% but need to be re-interpreted with a clinically meaningful pain reduction threshold of 30%.

### Chronic Migraine

Evidence for ONS in ICM is based on three industry-sponsored multicenter randomized control trials (RCTs), one long-term extension of these and one non-industry based cross-over trial. The RCTs consisted of the Precision Implantable Stimulator for Migraine (PRISM) study from Lipton et al in 2009; the Occipital Nerve Stimulation for the Treatment of Intractable Chronic Migraine headache (ONSTIM) trial from Saper et al in 2011; a multicenter trial from Silberstein et al (2012), with an open-label extension (Dodick et al, 2014) and the randomised cross-over study by



Serra and Marchioretto (2012).

The PRISM study consisted of 132 implanted episodic and chronic migraine patients (headaches  $\geq 6$  days/month) with or without acute medication overuse randomized to active or sham stimulation for 12 weeks (Lipton et al 2009). The study failed to show a significant difference between groups in the primary outcome of reduction in migraine days a month (-5.5 days vs. -3.9 days/month). 2-year safety data revealed infection and implant pain as the most frequent adverse events. The study data are only published in abstract form and therefore very limited data are available. Nonetheless, the authors have reported that patients with medication overuse headache responded poorly to ONS, which contributed to the overall negative primary endpoint.

The ONSTIM trial consisted of 49 implanted subjects (randomized to active adjustable or preset suboptimal stimulation) and 17 medically managed patients followed over 12 weeks (Saper et al, 2011). A responder was defined as a subject who achieved a 50% or greater reduction in number of headache days a month or a more than 3-point reduction in pain intensity. The ONSTIM trial found a 39% responder rate for active stimulation, 6% for preset stimulation and 0% for medical management. The reduction in headache days per month was calculated as 6.7 for the active group, 1.5 for the preset group and 1.0 for the medically managed group. The difference between active and control groups was proven to be statistically significant. Significant improvements in disability and quality of life scores were seen in the active group in the Profile of Moods States (POMS), Migraine Disability Assessment (MIDAS) and SF-36 scores. 66% of patients in the active group and 25% of patients in the preset stimulation group reported satisfaction with treatment at 12 weeks. The most frequently reported adverse events were lead migration (24%), implant site infection (18%) and implant site pain (4%).

Silberstein et al (2012) implanted 157 patients and randomized them to active or sham stimulation over a 12-week period. Although no difference was found in the numbers reaching a 50% or more reduction in headache pain (17.1% v 13.5%), there was a significant difference between groups in those achieving a 30% or more reduction in pain and in headache days a month (37.1 vs 17.3,  $P=0.011$ ). MIDAS scores were significantly reduced in the active group compared to control (reductions of 64.4 vs. 20.4 points) and significantly more patients in the active group rated their pain relief as "good" or "excellent" (51.4 vs 19.2;  $P<0.001$ ). The most frequently reported adverse events were implant site pain (9.8%), unintended stimulation effects (6.5%) and lead migration (5%). The overall rate of serious device-or procedure-related events was 1.0%, including one case of infection and one case of unexpected post-operative pain that required hospitalization this rate is consistent with other neuromodulation device implantation.

A 52-week open-label extension of the Silberstein trial (Dodick et al, 2014) found a 30% responder rate of 59.5% and a 50% responder rate of 47.8%. Headache days

were significantly reduced by 6.7 days/month at 52 weeks. Mean MIDAS scores fell by 50.9 points (156.6 days vs. 105.7 days/month), 55.7% of patients reported “excellent” or “good” headache relief and 68.4% of patients reported an improvement in their quality of life at 52 weeks post-implant.

Serra and Marchioretto (2012) conducted a randomized crossover study of 29 patients with subjects randomized to “stimulation on” or “stimulation off” for one month followed up active stimulation in all subjects for a year; 85% of patients had medication overuse headache at implant. Headache intensity and frequency were significantly lower in the active arm with 66% reporting a reduction of 50% or more in the number and severity of attacks. MIDAS and SF-36 scores were both improved at 12 months (MIDAS reduced by 56 points, SF-36 Physical component increased by 2.5 and SF-36 Mental component by 7.4 points). The group reported a significant reduction in in the monthly dose of triptans. Two implant infections and 3 lead dislocations were reported in the group.

### **Chronic Cluster Headache**

There are no randomized controlled trials on the use of ONS in CCH. Evidence for its use is based on a number of case series.

Burns et al (2007), reported on 8 patients with refractory CCH followed up over a median over 20 months. Six patients reported clinical improvements in both frequency and severity of attacks, which led them to recommend the treatment to others. The same authors published a follow up series of 14 patients with intractable CCH managed with bilateral ONS (2009) with a median follow up of 17.5 months; 10/14 patients reported clinical improvements in pain reduction, 3 had marked ( $\geq 90\%$ ), 3 moderate (40 to 60%) and 4 mild (20 to 30%) improvements within days of implantation and most patients reported return of cluster headaches once the ONS was switched off. This recrudescence of headaches with stimulation off is supportive data for a biological effect rather than a placebo response, albeit that the placebo effect is not excluded, especially if we take into account that the patients have arrived at this treatment having had many other interventions

Magis et al (2007) published pilot data of 8 patients with refractory CCH undergoing ONS; after mean follow up of 15.8 months, the attack rate per person per month fell by 49.8%. Two patients were rendered pain free, 3 had a 90% reduction in attacks and 2 had a 40% improvement. In this group, patients were able to reduce their preventative medications but no difference was found in the use of Sumatriptan injections. It is noteworthy that several patients commented that oxygen inhalation, which they had abandoned before ONS treatment, had become effective again. When ONS was switched off or battery depleted, attacks recurred within 1-4 days. No serious adverse events were recorded in this series. The same authors published a follow-up study of 15 patients in 2011 with a mean follow up time of 36.83 months (Magis et al, 2011); 80% had a 90% or more reduction in attacks with 60% becoming pain free for prolonged periods of time; 9 patients reported

themselves to be very satisfied with their treatment. Significant electrode migration was seen in one patient, and infection in 3.

Fontaine et al (2011), reported data on 13 CCH patients with a mean follow up of 14.6 months. In this group, the mean attack frequency reduced by 68% and by the time of last follow-up 77% reported a 50% or more reduction in attacks. The majority of patients considered their outcome as excellent or good and all but one would have recommended the treatment to others; 8 patients were able to stop or reduce preventative treatments. Hardware infection was reported in one patient but no lead migrations were seen.

Mueller et al (2011), published their long-term experience of ONS in CCH; 10 patients had been followed up for a mean of 12 months. 90% of patients reported reduction in frequency, duration and severity of attacks. All patients reported a subjective improvement in their quality of life and SF-36 psychological scores showed a tendency towards improvement and 70% of patients were able to reduce their intake of acute medication. Two patients underwent additional surgery, one for infection and one for scar tissue around a lead connector.

In these four open label series of 10-15 patients each (total 51 patients), 78% (41 patients) report a clinically meaningful response to ONS.

#### **Mixed Headache Type Data**

Some groups have published their clinical experience of ONS in a mixed headache group. The majority of these cases are chronic migraine (CM) and CCH.

Schwedt et al (2007) performed a retrospective analysis of 15 patients with a mean of 19 months follow up; 8 patients had CM and 3 CCH. Three-month headache frequency reduced by nearly one-third and 60% reported at least 50% reduction in headache pain. MIDAS scores were reduced by a mean of 70 points from a baseline of 178 points; two-thirds of patients had MIDAS scores in the severely disabled range at baseline and one-third of patients improved by at least one grade at final follow-up. Headache Impact Test (HIT-6) scores improved by a mean of 11 points from a baseline of 71 points and Becks Depression Inventory Scores (BDI-II) improved by a mean of 8 points. The most common adverse event was lead migration with 8 of the 15 requiring surgical intervention for this.

Brewer et al (2013) published their experience of 26 patients implanted over a 8.5-year period. The group consisted of 12 CM and 5 CCH patients. For those with CM, follow up ranged from 1-70 months and ONS was considered successful in 42%. CCH had a follow up of 5-102 months with a success rate of 80%. MIDAS scores were reduced by 49.9% in the group as a whole. There were a total of 25 lead revisions with 15 patients undergoing at least one lead revision.

Palmisani et al (2013) published a retrospective review of ONS including 19 CM and 1 CCH patient in their 25 subject; mean follow up was 36 months. Nine patients

(53%) reported a 50% or more reduction in attack frequency and or intensity; 10 subjects required surgical revisions with 90% of these for lead problems.

### **UK Experience at a Single Tertiary Referral Centre**

The National Hospital for Neurology and Neurosurgery in London has implanted 165 ONS systems for medically intractable chronic headache disorders since 2007. This group comprised a highly complex population with nearly 30% experiencing two or more refractory chronic headache disorders. At the time of implant, patients had failed an average of 12 preventative drugs. 90% scored within the severely disabled range for MIDAS and HIT-6 and nearly 74% scoring within the moderate to severe range of the Hospital Anxiety or Depression or BDI scale. Even with this highly disabled group (which is more complex than the patient groups recruited in the published controlled and open trials of ONS), at a mean follow up of 40 months, 49% demonstrated a 30% or more reduction in headache severity (measured using a headache index). The response rate of the CCH group (58 subjects) was 56.1% and CM (76 subjects) 43.6%. Significant improvements were seen in MIDAS, HIT-6, HAD-D, BDI-II and SF-36 mental component scores in the responders. No change was seen in the scores of non-responders. Despite an average follow up of over 3 years the adverse event rates of the group were far more favorable than published data. Surgical interventions were needed for 13 events including 2 lead migrations, 3 electrode erosions and 1 lead fracture. 5 infections were reported of which only 1 required ex-implantation. The most common adverse event was painful stimulation requiring reprogramming of the ONS system (Unpublished data, Matharu M, 2014, personal communication).

### **Cost-Effectiveness**

Although ONS may be an expensive procedure, the cost and burden of disease on patients and society is great. The direct treatment costs for CCH patients have been estimated to be up to €9,073 for a six-month period in tertiary headache centers and a CM patients up to €1,535 a year (Gaul et al 2011; Stokes et al 2011). Muller et al (2013) looked at the direct costs on 24CCH and 3CM patients treated with ONS in Germany; 93% responded to treatment with 21 complications in 14 patients, 13 needing reoperation. The per-case-based cost was €28,186 (€9,445 for hospitalization and €18,741 for hardware costs) with a per-patient saving of €1,603 resulting from patients' reduction in triptan use post-ONS. The authors concluded that ONS has a relatively high initial cost factor that favorably decreases over time due to individual treatment costs. However, they comment that given only the most refractory patients are considered for ONS, it may be justified to use an expensive treatment as every other therapy has failed. The authors also state that the cost for ONS for refractory headaches is comparable to those of Multiple Sclerosis (€17,792 a year direct costs) or deep brain stimulation for Parkinson's disease (€18,456 for initial implant). Considering the significant distress, poor quality of life and the difficulties these patients have in contributing to society, this cost effective data is very reasonable. Indeed, the WHO reports that severe migraine is one of four most

disabling chronic conditions and therefore more disabling than multiple sclerosis and Parkinson's disease (Menken et al, 2000).

Unpublished data from the National Hospital for Neurology and Neurosurgery indicates that CCH responders to ONS reduce their triptan intake by 38 doses per month. Given that these doses are of subcutaneous Sumatriptan with an estimated cost of £20 per dose, this represents a saving of £760 per patient per month on triptans alone (Unpublished data, Matharu M, 2014, personal communication).

### **Published Guidelines for Neuromodulation for Headaches**

The European Headache Federation (EHF) released a statement on neuromodulation for chronic headaches in 2013 (Martelli et al, 2013). It concluded that ONS is an invasive and expensive technique that must be employed with caution and carefully considered for the most severely affected patients with medically refractory CCH and CM, in whom medication overuse headache has been excluded. EHF also recommended that outcome measures must include not only reduction in pain but also reductions in headache related disability, improvement in pain specific quality of life, total costs and improvement in functional capacity. This policy is in line with these principles.

NICE IPG-452 (2013) concludes that the evidence for ONS in refractory CM shows short-term efficacy but that there is little evidence as yet for long-term outcomes. With regard to safety there is a risk of complications requiring further surgery. They, therefore recommend that the procedure should only be used with special arrangements for clinical governance, consent, audit or research. It is noteworthy that at the time of publication of NICE IPG-452, long-term follow up data for ONS had not been published (Dodick et al. 2014).

### **Critical Evaluation**

Available evidence of the efficacy and safety of ONS for the management of medically refractory chronic headaches is still limited. There is variability in the outcome measures, patient numbers, inclusion criteria and statistical methods. Best evidence is based on open label studies with small sample sizes -as the number of patients with highly refractory chronic headaches is low- and placebo effects cannot be ruled out due to the nature of the treatment; stimulation results in perceivable occipital paraesthesia and therefore truly double-blind studies have not been possible.

The best attempts to randomized placebo controlled trials of ONS in CM have been achieved using sham stimulation as placebo. However, initial studies were reported to show no significant differences between active and sham groups as the expected outcome (> 50% reduction in symptoms) was too robust for such a highly intractable and disabled group. Patients deemed suitable for ONS have a high risk of treatment failure due to their past history and clinical improvements must be interpreted in the context of a highly disabled and refractory group. It is now recommended by the

International Headache Society clinical trials subcommittee and the Initiative on Methods, Measurement and Pain Assessment in Clinical Trials (IMMPACT) that a reduction of 30% or more in outcome measure reflects a clinically significant improvement in chronic pain groups (Dworkin et al 2010; Tfelt-Hansen et al 2012).

When Silberstein's et al (2012) data is analyzed using 30% improvement in pain as the outcome measure, then there was a significant improvement in those in the intervention arm (ONS) when compared with sham stimulation. The data from the PRISM study need to be interpreted with caution; the investigators included medication overuse headache (which complicates CM) and reported that this patient group responded poorly to ONS; exclusion of the medication overuse group would have likely resulted in a positive trial result. It is also imperative to focus not just on measures of pain but the associated disability in these patients; many of the studies, controlled and open label, have demonstrated both statistically and clinically significant improvements in these highly disabled groups of patients.

With regard to CCH, it is also highly unlikely that an adequately powered randomized controlled trial will be performed given the relatively rarity of this highly disabling, excruciating disorder taken together with the high costs associated with device trials.

The early clinical trial data reported relatively high rates of adverse events, which was unsurprising as the early studies were conducted when implanters had limited experience with the surgical techniques required. The adverse events reported include lead migration, lead site pain, myofascial incision site pain, neck stiffness, discharged battery, battery site pain, infection and contact dermatitis. With increasing surgical experience and introduction of surgical techniques, such as anchoring strategies for address lead migration, the adverse event profile of this procedure has improved. Clinicians should enter details about all patients undergoing ONS for intractable chronic migraine or chronic cluster headache onto the UK Neuromodulation Register which would allow a review of the policy more critically in the future.

## **6. Rationale behind the policy statement**

Chronic migraine and cluster headaches affect a large number of people in England. However, patients with medically intractable chronic migraines or refractory cluster headaches represent a small group of highly disabled individuals who are frequent users of out-patient and primary care services and experience high levels of disability and absenteeism from work or school.

ONS is considered to be an effective option for patients who are refractory to other available therapies. In patients who have exhausted the medical treatments, failure to offer further treatments such as ONS will result in these patients having to live with a very severe and highly disabling pain disorder for the remainder of their lives

and with a considerable risk of suicide if left untreated (Rozen and Fishman, 2012).

## 7. Criteria for commissioning

ONS is commissioned for adults (18 years or over) who meet all the criteria in either section A or B as indicated below, as appropriate to their clinical circumstances.

Patient criteria which would exclude treatment according to this policy are also listed below in section C.

### A. Medically intractable Chronic Migraine (refractory)

1. Patients with a confirmed diagnosis of chronic migraine as defined by the International Classification of Headache Disorders (ICHD-IIIbeta, 2013). The diagnosis needs to be confirmed by a Headache Specialist (appropriately trained and accredited) and experienced in the treatments available for the management of chronic migraine.

#### AND

2. Patients with confirmed diagnosis of intractable chronic migraine need to fulfil the following criteria:

- i. Well documented evidence of failure to benefit significantly from at least 4 of 5 classes of oral preventatives used routinely in practice for migraine treatment. The five classes of agents include (a) beta-blockers; (b) anticonvulsants - (topiramate, sodium valproate); (c) tricyclic anti-depressants; (d) serotonergic modulators (methysergide, pizotifen), and (e) angiotensin receptor blockers. These 4 classes must include beta-blockers and anticonvulsants (as outlined by NICE CG150, 2012). An adequate trial is defined as a period of time during which an appropriate dose of medication is administered, typically at least 2 months at optimal or maximum-tolerated dose, unless terminated early due to adverse effects;
- ii. Failed to respond to acupuncture as recommended by NICE CG150;
- iii. Failed to respond to cranial Botulinum toxin as defined by NICE TA 260;

Those patients to be considered intractable need to have medication (analgesic) overuse headache excluded or appropriately treated before consideration for ONS.

### B. Medically refractory Chronic Cluster Headaches

1. Patients with a confirmed diagnosis of chronic cluster headache as defined by the International Classification of Headache Disorders (ICHD-IIIbeta) for at least 2 years. The diagnosis needs to be confirmed by a Headache Specialist (appropriately trained and accredited) and experienced in the treatments available for the management of chronic cluster headache.

#### AND

2. In order to be classified as refractory patients should have:

- i. Well documented evidence of failure to benefit significantly from all the classes

of oral preventatives used routinely in practice for cluster headache treatment. These drugs comprise (a) verapamil, (b) lithium, (c) methysergide, (d) topiramate, (e) sodium valproate, (f) gabapentin, and (g) melatonin (where available). An adequate trial is defined as a period of time during which an appropriate dose of medication is administered at optimal or maximum-tolerated dose, unless terminated early due to adverse effects;

### C. Exclusion criteria

Patients where medication overuse headache is suspected will be excluded and have to undergo appropriate treatment.

Patients that are unable/unwilling to engage in self-management strategies supported by the MDT specialised in Headaches and where expectations are not appropriate.

## 8. Patient pathway

ONS should only be available at designated tertiary centres. Following NICE guidance, the selection of patients for treatment using ONS should be done by a multidisciplinary team (NICE IPG452, 2013).

To be considered for ONS patients need to have completed or been involved in an appropriate pain management assessment and treatment program with a multidisciplinary and multispecialty team as per Service Specification D08, Specialised Pain Services

Before being referred to the MDT all patients should be assessed by a neurologist specialised in headache **OR** a pain medicine specialist **AND** a psychologist.

The MDT will be comprised of:

- i. a suitably accredited and experienced headache subspecialty neurologist **OR** headache specialist;
- ii. a neurosurgeon **OR** interventional pain specialist [trained and experienced in ONS implantation (at least 10 per year)] to facilitate implantation and to manage device issues and complications;
- iii. a psychologist skilled in pain management assessment and intervention, working as a team to promote self-management using the implant through a pain management program **OR** psychiatrist to optimally screen for and manage relevant issues; **AND**
- iv. a headache nurse specialist **OR** neuromodulation nurse practitioner or back up team to support, review medication and ONS device issues.

In addition, patients should be provided with clear written information about the efficacy and safety of the procedure.



## 9. Governance arrangements

ONS should only be performed in an experienced specialist tertiary centre willing to gather and evaluate patient information, publish its results and use established clinically relevant patient outcomes that robustly document treatment response, long term sequential quality of life assessment, device related complications and morbidity rates.

## 10. Mechanism for funding

NHS England will routinely fund ONS for patients with chronic migraine and cluster headaches as long as the strict selection criteria and governance arrangements outlined in this policy are met.

## 11. Audit requirements

Centres should audit and review clinical outcomes locally including complications, adjunctive or subsequent treatments, changes in measures of pain, function and quality of life, particularly in the long term and should document and consider their relationship to patient characteristics.

Providers will be expected to provide information on activity and outcomes on request.

In addition, clinicians should enter details about all patients undergoing ONS for intractable chronic migraine or chronic cluster headache onto the **UK Neuromodulation Register**.

## 12. Documents which have informed this policy

See Reference list below.

## 13. Links to other policies

This policy follows the principles set out in the ethical framework that govern the commissioning of NHS healthcare and those policies dealing with the approach to experimental treatments and processes for the management of individual funding requests (IFR).

## 14. Date of review

This policy will be reviewed in April 2017 unless information is received which indicates that the proposed review date should be brought forward or delayed.

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