Phase 1 of Integrated EMDR

An Abortive Treatment for Migraine Headaches

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Forty-three individuals diagnosed with classic or common migraine headache were randomly assigned to either phase 1 of integrated eye movement desensitization reprocessing (EMDR) treatment or a standard care medication treatment. Integrated EMDR combines diaphragmatic breathing, cranial compression, and EMDR for abortive migraine treatment. The comparison standard care medication group received various abortive medications, including Demerol, DHE, oral triptans, Excedrin, Fiorinal, Percocet, Toradol, and Vicodin. Participants were treated during mid- to late-stage acute migraine and assessed by an independent evaluator at pretreatment, posttreatment, 24 hours, 48 hours, and 7 days for migraine pain level. Both standard care medication and integrated EMDR treatment groups demonstrated reduced migraine pain levels immediately at posttreatment, 24 hours, 48 hours, and 7 days. However, integrated EMDR treatment reduced or eliminated migraine pain with greater rapidity and showed significantly greater improvement compared to standard care medication immediately posttreatment.

Keywords: migraine headache; EMDR; medication; headache treatment

This study introduces an integrated eye movement desensitization and reprocessing (EMDR) treatment for acute migraine headaches. Integrated EMDR has two treatment phases. Phase 1 is designed for the alleviation of acute migraine symptoms. Phase 2 is designed to reduce the frequency, intensity, and duration of future migraine episodes. Phase 2 utilizes the standard EMDR protocol in its entirety. During phase 1, which is the focus of this study, we deviate from the standard EMDR protocol because of the patient's urgent need for aborting the debilitating pain of acute migraine. In phase 1, the bilateral stimulation (eye movements) is extracted from the standard EMDR protocol to facilitate abortive treatment for migraine.

The term *integrated EMDR* denotes the unique coupling of EMDR with diaphragmatic breathing and cranial compression for migraine-specific treatment. The researcher developed this form of EMDR treatment specifically to treat migraine. Phase 1 of integrated EMDR sequentially combines diaphragmatic breathing, cranial compression, and eye movements to abort a migraine in progress. Diaphragmatic breathing is utilized in integrated EMDR to stimulate the parasympathetic nervous system to begin the relaxation response. Cranial compression is used to help the migraine patient relax certain trigger points around the head. A process of trial and error prior to the study found that each of the methods used independently had some effect in reducing migraine pain. However, these components individually seldom eliminated migraine pain across many patients. The combination of head compression, diaphragmatic breathing, and eye movements consistently led to a higher success rate. It is theorized that it is the synergy of these three components that leads to the amelioration of acute migraine symptoms.

Headaches

Headaches are the most common pain-related symptom and the seventh-leading problem seen in medical

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practice in the United States. Migraine and tension headaches account for 18 million physician visits a year and cause 112 million bedridden days per year in the United States (Ries, 1986). Migraine headache has a 1-year reported prevalence rate of 12% to 14% in the United States (Sheffield, 1998). Migraine rates are 3.3 times higher for women than men (Sheffield, 1998). Migraine sufferers are often disabled in the latter stages of an acute attack. Lipton, Diamond, Reed, Diamond, and Stewart (2001) found that 90% of migraine sufferers reported functional impairment with their headaches, 53% required bed rest, 51% reported reduced productivity, and nearly one-third missed 1 day of work or school in the 3 months preceding the survey. Moreover, it was noted that the disruption from migraine in family, household, and social activities surpassed the disruption of work activities.

Migraine prevalence and occupational, familial, and social impact elevate it to a major public health issue. A cross-sectional study of 28,902 randomly selected working adults found that headache complaints are the most common pain condition occurring in the American workforce (Stewart, 2003). Missed workdays and lost productivity in the American workforce due to migraine is estimated to be $13 billion per year (Hu, Markson, Lipton, Stewart, & Berger, 1999). Physician office visits, prescription drugs, and hospitalizations for migraine care average $1 billion annually. According to Clouse and Osterhaus (1994), migraine patients generated twice as many medical and pharmacy claims as patients without migraine in an HMO setting.

Pharmacologic therapies have been the most widely used approach for treating migraine. While millions of migraine patients benefit from the use of medication, unfortunately pharmacological treatments are ineffective or inadequate for a sizable minority of individuals. One-third of patients participating in clinical trials with oral triptans fail to respond (Tfelt-Hansen, De Vries, & Saxena, 2000). Moreover, fewer than half become pain free, which is one of the primary efficacy measures recommended by the International Headache Society (Goadsby, 2002). Other reasons for considering behavioral interventions for migraine alleviation are patient preferences for nonpharmacological treatments, pregnancy, planned pregnancy, nursing, patient abuse or overuse of abortive pain medications, poor medication tolerance, medical contraindications, or medication rebound. Rebound may occur when triptans are used more than two times in a 24-hour period.

Behavioral Treatments for Migraine

Goslin et al. (1999) conducted an exhaustive literature search and identified 355 articles describing behavioral and physical treatments for migraine. Seventy of these studies were controlled clinical trials of adult migraine patients. Of the 70 studies, 39 were randomized controlled trials utilizing biofeedback, relaxation training, or cognitive-behavioral therapy. A meta-analysis of these studies indicated that relaxation training, thermal biofeedback with relaxation training, electromyographic biofeedback, and cognitive-behavioral therapy were all statistically more effective than a wait-list control for reduction in migraine episodes.

In a retrospective study of 494 migraine patients, the most frequently reported headache trigger was stress (62%) (Robbins, 1994). In a prospective study, 385 migraine sufferers kept detailed headache diaries (Chabriat, Danchot, Michel, Joire, & Henry, 1999). The most common migraine precipitants in more than 1,000 headaches reported by this cohort were fatigue or sleep problems (80%) or stress itself (42%). Another prospective study of 100 migraineurs reported that more than 50% of their headaches were related to a stressful event (Henryk-Gutt & Rees, 1973). Boardman, Thomas, Milson, and Croft (2006) found that the migraine attack itself causes considerable anxiety in patients.

For more than three decades, behavioral interventions have been used to reduce anxiety and stress. Behavioral interventions, chiefly relaxation training, biofeedback, cognitive behavior therapy, and stress management, have been standard components in the treatment of migraine (Penzien, Rains, & Andrasik, 2002). These behavioral modalities have been shown to reduce migraine frequency in a substantial percentage of migraine patients (Scopp, 1992).

Diaphragmatic Breathing

Breathing exercises have also been used to treat migraine (Passchier, 2001). Diaphragmatic breathing methods are often used for inducing general relaxation for high emotional and physical arousal states like those in found in panic and generalized anxiety disorders (Zuercher-White, 1995). Diaphragmatic breathing involves slow, deep rhythmic breaths that originate from the diaphragm and is commonly known as "belly breathing."

Head Compression

Simons, Travell, and Simons (1999) describe referred pain patterns from various myofascial trigger points around the head and neck that may contribute to

migraine pain. A trigger point is a hyperirritable area associated with taut skeletal muscles. Among the trigger points mentioned by Simons et al. are the temporalis muscle and the sternocleidomastoid muscle. When compared with normal control subjects, Fernandez-de-las-Penas, Cuadrado, and Pareja (2006) showed temporalis, sternocleidomastoid, and upper trapezius muscles to be active trigger points only in the migraine patients.

Head compression has also been utilized in relieving migraine and tension headaches. Zanchin et al. (2001) studied a sample of 400 patients self-administered pain-relieving maneuvers for their migraine and tension headaches. The most commonly used approach was head compression of the temples and forehead, reported by 36% of patients experiencing migraine without aura and 44% of those with aura. However, only a small minority reported good or excellent pain control with head compression; most found that it produced only temporary relief. In spite of this, patients continued to use head compression repeatedly for the short-term benefits during each migraine attack.

EMDR Treatment of Chronic Pain

EMDR is a psychotherapy approach that was developed to reduce or eliminate the distress that results from unresolved traumatic memories. Numerous randomized clinical trials have demonstrated its efficacy in the treatment of posttraumatic stress disorder (e.g., Marcus, Marquis, & Sakai, 1997, 2004; van der Kolk et al., 2007). It is currently listed as an effective and empirically supported treatment by the American Psychiatric Association (2004) and in Bisson and Andrew (2007).

EMDR utilizes a comprehensive approach to treatment with an eight-phase protocol that addresses past, present, and future contributors to current disturbance (Shapiro, 2001). During EMDR, the patient concentrates on a negative traumatic memory, body sensation, or pain while also focusing on an external stimulus, such as eye movements or bilateral tapping. EMDR is guided by an adaptive information processing model (Shapiro, 2001, 2002) that views distressing or traumatic memories that are stored in the brain as giving rise to maladaptive cognitions, emotions, sensations, or behaviors unless the information contained in memory has been adequately processed. This adaptive information processing model sees chronic pain, including migraine pain, as involving a disturbing somatic component, combined with the emotional response to the pain as stored in the brain. Therefore, EMDR treatment of pain, including migraine, incorporates the processing of pain-related etiological events along with the disturbing affect and body sensations associated with the pain.

Preliminary studies have indicated that EMDR treatment of distressing events may reduce related chronic pain. A recent study of five cases of phantom limb pain reported a complete cessation of pain in two cases and reduced frequency and/or intensity in the remaining three (Schneider, Hoffman, Rost, & Shapiro, 2007). In a case study by Grant and Threlfo (2002), three chronic pain patients reported decreased pain levels, decreased negative affect, and increased ability to control their pain following the EMDR intervention. Thus far, there are no randomized controlled studies utilizing EMDR specifically for the treatment of pain.

A number of studies have also demonstrated that EMDR effectively reduces autonomic arousal. Researchers have determined that following EMDR treatment, there is a reduction in anxious arousal (Cvetek, this issue), a decrease in heart rate and skin conductance (Wilson, Silver, Covi, & Foster, 1996; Khalfa, Roques, & Blin, this issue), and an increase in heart rate variability, reflecting improved parasympathetic tone (Sack, Lempa, Hofmann, Steinmetz, & Lamprecht, 2007). Further, research on the effects of eye movements on autobiographical memories has demonstrated a reduction in emotional arousal (Andrade, Kavanagh, & Baddley, 1997; Barrowcliff, Gray, Freeman, & MacCulloch, 2004; Kavanagh, Freese, Andrade, & May, 2001; Van den Hout, Muris, Salemink, & Kindt, 2001).

Since EMDR has shown some utility in treating chronic pain and also reduces autonomic arousal, could it also prove to be valuable in the treatment of migraine? Head compression and breathing appear to be a common naturalistic forms of headache pain control used by migraine sufferers. Could pain control be increased if the compression was externally applied and physically leveraged by a health care provider rather than self-administered? Could some pain control result from applying compression to the temporalis, sternocleidomastoid, and occipital muscles? This study asks if migraine attacks can be aborted though the synergy of head compression, diaphragmatic breathing, and EMDR.

Methods

Independent Assessor

The independent assessor had a master's degree. She conducted all interviews and collected all data to minimize participant to treatment provider demand characteristics. The assessor was unfamiliar with the

integrated EMDR procedure administered by the psychologists or the chemical actions of the various medications prescribed by the primary care physician (PCP).

Participants

Figure 1 displays the participants' flow through the study. Fifty-two individuals who were seeking treatment for acute migraine volunteered for this study. These individuals were members of a large HMO and were referred from primary care, neurology, or emergency outpatient departments. The patients were recruited by the independent assessor when they presented for abortive migraine treatment to either the emergency, the internal medicine, or the neurology department. The assessor conducted all pre- and posttest interviews and screened all participants for inclusion/exclusion criteria. To be included, individuals needed an ICD-10 diagnosis from their neurologist or PCP of classical migraine (346.00) or common migraine (346.10) and to report a current subjective pain level (SPL) of 6 or greater on a scale of 0 to 10 points. All individuals in this study had a previous diagnosis of migraine on record and were also assessed by their current health care provider at the time of treatment. Individuals were excluded from the study for the following reasons: preexisting heart, lung, vascular, or ocular condition; pregnancy; chronic daily headache; chronic pain condition; serious mental illness (e.g., bipolar disorder, major depression, psychosis, or dissociative disorder); drug abuse; or failure to comply with screening.

Participants were randomly assigned to treatment conditions: 26 to the standard care medication group and 26 to integrated EMDR. Forty-three individuals completed the study and the follow-up assessment, 21 in the standard care medication condition and 22 in the integrated EMDR condition. Of the nine noncompleters, seven failed to respond to follow-up inquiries or complete their headache diaries (four from the standard medication group and three from the integrated EMDR group). One participant was excluded from the integrated EMDR group for a severe neck injury unreported at screening, and one extreme outlier was excluded because he received zero benefit from medication and his migraine remained at a strong pain level of 10 throughout the 7-day follow-up period.

Participants' self-reported ethnicity were 21 White Americans, 12 Asian Americans and Pacific Islanders, 9 Hispanics, and 1 African American. Their ages ranged from 22 to 62 years (mean = 38 years). The standard care medication group was comprised of 21 females and 1 male. The integrated EMDR group had 20 females and 1 male. Participants had a history of migraine ranging from 3 months to 36 years, with a mean of 12.5 years. The standard care medication group averaged 11.8 years of migraines; the integrated EMDR group averaged 13.2 years of migraines.

Measures

Subjective pain level (SPL) was the primary measure used in this study. Participants reported their SPL on an 11-point scale from 0 to 10. When a participant reported a zero SPL, their migraine pain was considered alleviated. Each participant's SPL score was recorded by the assessor at pretreatment to provide baseline data. The SPL was reassessed at initial posttreatment, 24 hours, 48 hours, and 7 days in person or by telephone interview. Participants also recorded SPL on their daily headache dairy during the 7-day follow-up period.

Pretreatment measures included the Migraine Disability Assessment Scale (MIDAS; Stewart, Lipton, & Sawyer, 1998) and the Headache Disability Inventory (HDI; Jacobson, Ramadan, Aggarwal, & Newman, 1994). The MIDAS has five questions that assess a patient's disability from migraine in the areas of work, school, family, and social over the past 3 months. The HDI is a 25-item self-report questionnaire that assesses headache disability subgrouped into functional and emotional domains. These two measures were used for gathering historical information regarding the participant's headache-related disability and to validate randomization.

Experimental Procedure

After ascertaining whether the potential participant met the inclusion criteria for entry into this study, the independent assessor reviewed the medical research consent form, administered the HDI and the MDAS, checked the subject's SPL, and briefly discussed the 7-day follow-up observation period and headache diary. If a participant was unable to read the consent form, MIDAS, or HDI because of migraine pain or photophobia, the questions were read to the participant by the assessor. The participant was then randomly assigned to either the standard care medication or the integrated EMDR condition and immediately received treatment.

Standard Care Medication Treatment

The participant was administered the standard care medication immediately following a 10- to 15-minute medical visit with the physician or nurse. The standard care medications for acute migraine were administered

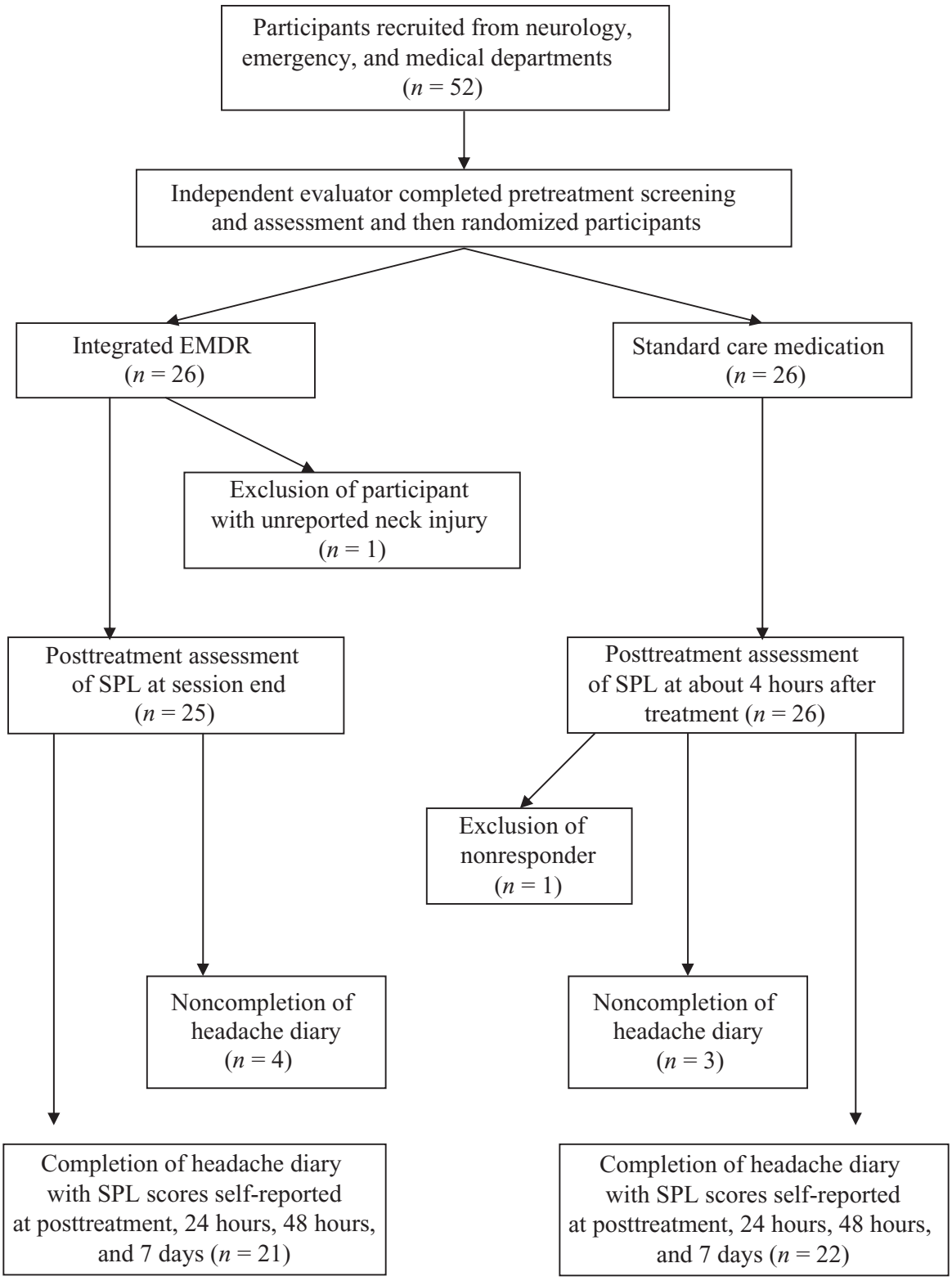

FIGURE 1. Flow of participants through the study.

by the patients' PCP or by a registered nurse, under the supervision of a PCP or neurologist. No attempt was made to interfere with the standard prescribing practices of PCPs. Standard care medication for migraine included the medication doses shown in Table 1.

Since medication treatment effects vary in length of time from 1 hour to many hours, the posttreatment SPL for the standard care medication group was obtained by telephone by the independent assessor.

TABLE 1. Standard Care Medication

Medication Name	Medication Dose
Oral medications for migraine	
Amerge	1–2.5 mg
Cafergot	Caffeine 100 mg/ergotamine 1 g
Duradrin	100–325 mg
Fioricet	Butalbital 50 mg/acetaminophen 325 mg/caffeine 40 mg
Fiorinal	Butalbital 50 mg/aspirin 325 mg/caffeine 40 mg
Ibuprofen	400–800 mg
Imitrex	25–50 mg
Indocin	25–75 mg
Maxalt	5–10 mg
Midrin	100–325 mg
Naprosyn	250–750 mg
Percocet	Oxycodone 10 mg/acetaminophen 650 mg
Reglan	10–15 mg
Vicodin ES	Hydrocodone 7.5 mg/acetaminophen 500 mg
Injected prescription medications for migraine	
Compazine	10 mg
Demerol	50–125 mg
DHE 45	0.5–1.0 mg
Imitrex	6 mg
Phenergan	25–50 mg
Toradol	25–75 mg

Integrated EMDR Treatment

With exception of one individual, those participants randomized to integrated EMDR received no medication and were treated by one of two doctoral-level psychologists trained to administer integrated EMDR to abort migraine. One of the integrated EMDR participants with SPL of 7 at the time of treatment had taken ibuprofen 5 to 6 hours prior to arriving at the hospital. This over-the-counter preparation was having no reported impact on their migraine symptoms at the time of treatment.

Integrated EMDR begins with the participant's use of diaphragmatic breathing coupled with head compression by the provider. Integrated EMDR has three steps. The procedure is generally repeated for roughly 12 to 30 minutes or until the migraine pain and related migraine symptoms are ameliorated.

- Step 1: The patient begins with diaphragmatic breathing.
- Step 2: The provider, at intervals of 10 to 20 seconds, firmly applies compression with the hands to the frontal and occipital cranial areas, then to the left and right temporal areas. The provider firmly holds the patient's head, alternating the pressure from the frontal-occipital to the temporal areas repeatedly for a minimum of five to six rotations.
- Step 3: As the patient continues the diaphragmatic breathing, the provider ceases the head compression and administers EMDR in the form of slow eye movements in a figure-eight pattern for 30 to 90 seconds.

The maximum time allocated for an integrated EMDR treatment was 1 hour, with treatment terminated when the patient reported zero pain or at 60 minutes. The mean integrated EMDR treatment time was 28 minutes, with a range from 12 minutes (one case) to 60 minutes (two cases). Only one integrated EMDR treatment session was provided to each participant for relief of the current migraine episode. Following the treatment, the assessor evaluated the participants' SPLs.

Prior to the study and halfway through the study, the psychologists were assessed for fidelity to the

integrated EMDR treatment protocol. Initial treatment fidelity for the psychologists was conducted by conjointly reviewing phase 1 of the integrated EMDR protocol and practicing the protocol on each other. This procedure synchronized hand positions for head compression, diaphragmatic breathing instructions, and protocol fidelity. The midterm fidelity check was videotaped as the psychologist providers once again conjointly reviewed and practiced the treatment protocol. This video was subsequently reviewed by the two psychologists.

Headache Diary

Following the administration of treatment, the assessor instructed both groups in the use of the headache diary. Participants were instructed to record severity and duration of migraine pain as well as when they reached zero subjective pain. Participants maintained the headache diary during the 7-day follow-up period following their standard care medication or integrated EMDR treatment. The minimum requirement for the headache diary was to log all posttreatment migraine activity and medication use. The diary was used to evaluate an individual's migraine occurrences and to back up the telephone interviews. Participants used an 11-point scale of 0 to 10 SPL to indicate their level of migraine pain. Participants also denoted in the diary if and when they used additional medication. Logging additional information, such as mood, caffeine use, length of sleep per night, and meal times, was optional. The assessor personally collected all participant data at initial posttreatment, 24 hours, 48 hours, and 7 days.

A participant could make entries to the diary every 30 to 60 minutes as needed to identify migraine pain level or medication utilization. Seven days following migraine treatment, the assessor collected the headache diary from all participants. The assessor was unfamiliar with the integrated EMDR procedure administered by the psychologists or the chemical actions of the various medications prescribed by the PCP.

Results

Demographic Variables

Participants' self-reported ethnicity was 21 White Americans, 12 Asian Americans and Pacific Islanders, 9 Hispanics, and 1 African American. Participants in the integrated EMDR treatment condition were less likely to be White Americans (30%) than participants in the standard care medication treatment condition (68%), $\chi^2(1, N = 42) = 6.11$, $p < .05$. However, controlling for these differences by including ethnicity as a covariate in an analysis of variance (ANOVA) did not affect the results. Demographic characteristics of participants are presented in Table 2.

There were no significant baseline treatment group differences in gender composition, age, pretreatment MIDAS, HDI, or SPL. Mean pretreatment scores on the MIDAS were above the cutoff score of 21, considered to represent severe headache disability (integrated EMDR $M = 26$ and standard care medication $M = 26.05$). Pretreatment headache disability scores on the HDI for integrated EMDR ($M = 55.62$) and for standard care medication ($M = 53.73$) were above the HDI cutoff score of 29, indicating substantial disability. The mean pretreatment SPL was 7.24 for integrated EMDR and 8.00 for standard care medication. A score of 7 SPL or above was considered to be severe migraine pain.

TABLE 2. Sample Characteristics

	Means (*SD*) and Percentages	
	Integrated EMDR	Standard Care Medication
Demographics		
Proportion female (%)	95.2	95.5
Proportion White American (%)*	30.0	68.2
Age	38.33 (10.57)	37.95 (9.57)
Characteristics of the migraines		
Pretreatment subjective pain levels	7.24 (1.51)	8.00 (1.54)
HDI[a]	55.62 (19.36)	53.75 (26.99)
MIDAS[b]	26.00 (25.36)	26.05 (21.68)

[a]HDI = Headache Disability Inventory. [b]MIDAS = Migraine Disability Assessment Scale.
* $p < .05$.

Procedural Variable

Participants in the integrated EMDR treatment condition were assessed at the end of the session ($M = 28$ minutes; $SD = 17$ minutes). Participants in the standard care medication condition were assessed about 4 hours after taking medication ($M = 4$ hours, 8 minutes; $SD = 3$ hours, 49 minutes), $F(4, 160) = 62.14$, $p < .01$. Following the administration of medication, five medication group participants went home and fell asleep. Therefore, their next journal entry or phone assessment occurred after they awoke. Controlling for the length of time difference by including time as a covariate in an ANOVA did not affect the results.

Migraine Treatment Effect

Participants' reports of SPLs over time were examined by conducting a two-factor repeated-measures ANOVA (Treatment Condition [integrated EMDR and standard care medication] × Assessment Times [pretreatment, posttreatment, 24 hours, 48 hours, and 7 days]). There was a significant main effect for treatment ($F[1, 41] = 10.62$, $p < .01$) and a significant main effect of assessment time ($F[4, 160] = 62.14$, $p < .01$). This indicates that participants across treatment groups reported decreased SPLs (see Figure 2). Planned contrast revealed that SPLs were significantly reduced from pretreatment to posttreatment assessment and remained at levels significantly below pretreatment levels throughout the 7-day follow-up period. Both standard care medication and integrated EMDR groups improved over time.

Two-factor analyses of covariance (Treatment Condition [Integrated EMDR and standard care medication]) were conducted in order to determine whether participants in these groups significantly differed in their SPLs at each time point, controlling for their pretreatment SPLs. These analyses revealed a significant difference at the initial posttreatment assessment but not at subsequent time points. Participants in the integrated EMDR group reported significantly lower SPLs than participants in the standard care medication group at the initial posttreatment assessment, controlling for time in hours from treatment to assessment ($F[1, 39] = 12.78$, $p < .01$). Effect size at posttreatment was .247. Standard care medication and integrated EMDR did not differ significantly in their SPLs at 24 hours ($F[1, 40] = 2.64$, *ns*), 48 hours ($F[1, 40] = 1.83$, *ns*), and 7 days ($F[1,40] = 0.8$, *ns*) following treatment (see Figure 2).

Compared to the standard care medication group, the integrated EMDR participants achieved pain-free status more rapidly. At 20 minutes, 48% of the integrated EMDR treatment group reached zero SPL. At 30 minutes, 62% reached zero, and at 1 hour, 81% had reached zero SPL. If the participants who maintained a low SPL of 1 are included with those who scored zero after 1 hour, 95% were in this category at posttreatment. By contrast, only 5% of the standard care medication group reached zero SPL within an hour and a half. Forty-one percent of the medication group reached zero by 8 hours, and 55% reached zero within 10 hours (after sleep). Five participants of the standard care medication group reported that relief times were longer because participants took their medication, went to sleep with migraine pain, and made their first entry in their headache diary after awakening. Controlling for this reporting time difference statistically indicates that this did not affect the treatment results.

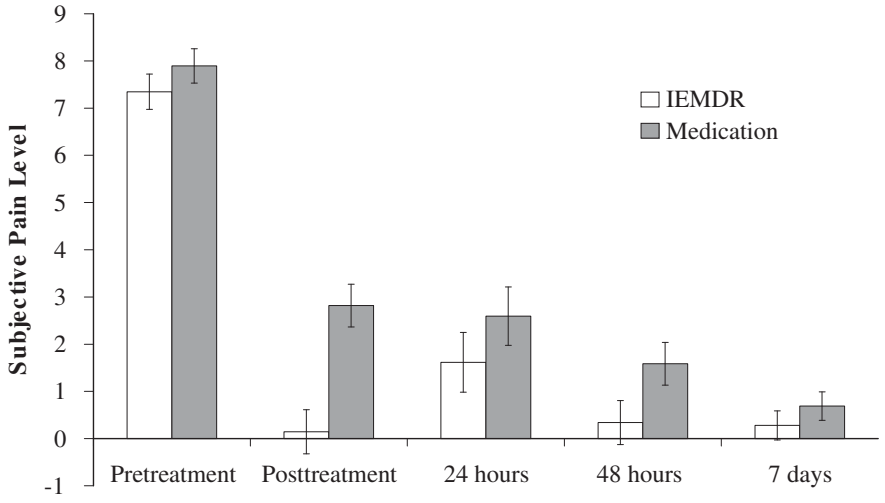

FIGURE 2. Subjective pain level: Integrated EMDR compared to standard care medication.

At treatment and initial posttreatment, no additional or rescue medication was used by either group. However, during the 24-hour to 7-day follow-up period after treatment, participants reported rescue medication use for mild migraine symptoms in their headache diary. Fifteen members of the standard care medication group used rescue medication (seven used an oral triptan, four ibuprofen, one Depakote, one Vicodin, and 1 Excedrin). Nine members of the integrated EMDR group used rescue medication (three used ibuprofen, two acetaminophen, three oral triptans, and one Darvocet).

Discussion

For years, standard care medication has been used effectively to treat migraine pain. Treatment outcomes from this study suggest that integrated EMDR may also be an effective nonmedication approach for aborting migraine headaches. For most of the participants, integrated EMDR seemed to provide pain-free efficacy, rapid return to normal functioning, and zero reports of any negative side effects. Integrated EMDR appears to be a safe procedure since there were no adverse side effects reported by any treated participants. The data also show that the positive treatment effects of integrated EMDR, like that of the standard care medication, are generally maintained over a 7-day period.

According to Lipton, Hamelsky, and Dayno (2002), patients' ratings of complete pain relief, rapid pain relief, no headache recurrence, and no side effects are the four most important treatment outcomes. Integrated EMDR appears to bring both rapid and complete pain relief in most participants posttreatment. Integrated EMDR participants had minimal symptom recurrence during the 7-day follow-up period after only one treatment session of 12 minutes to 1 hour (mean = 28 minutes). A quantitative systematic review of pharmacological treatments (Oldman, Smith, McQuay, & Moore, 2002) found that oral triptans give complete pain relief to only about 30% to 40% of migraineurs within the first 2 hours. Brandes (2004) found that early treatment with Eletriptan (40 mg) was 68% effective for mild headaches and 39% effective for moderate to severe headaches at 2 hours. Since the participants in this study had pretreatment mean pain levels between 7 and 8 and did not have early intervention, they were most likely experiencing moderate to severe mid- to late-stage migraine. Although both standard care medication and integrated EMDR conditions provided pain relief for migraine symptoms, integrated EMDR participants seemed to respond to treatment with greater rapidity in gaining those positive results posttreatment.

Although the study presents sound racial and cultural diversity, it is limited by a small ($n = 43$), homogeneous sample of mostly females. Therefore, treatment gains may be limited to this small sample of women. The length of the standard care medication pain relief times may be somewhat affected by delayed collection methods for the five participants who fell asleep following their medication intervention (Demerol injection or oral medication). Although sleep following the administration of migraine medication is common and often beneficial, this collection method could be improved in future studies. Monitoring patients posttreatment every 30 to 60 minutes until pain relief occurs could ensure more precise data in future research.

This clinical outcome study compares commonly used hospital medication regimens for migraine to integrated EMDR in an HMO setting. Physicians in this study prescribed various medications for migraine pain amelioration. There was no attempt in this study to make a head-to-head comparison of integrated EMDR with any specific medication. Future research could compare a single migraine medication to integrated EMDR, and this could improve study controls. However, the comparison of integrated EMDR to typical medication regimens prescribed at a hospital-based HMO may allow for some generalization of these findings to other hospital settings.

This is a randomized controlled study, but, as with most psychotherapy studies, it is not blinded. Once participants read the consent form prior to treatment, they became aware that two quite different treatment options existed. Although attempts were made to keep the independent assessor unaware of the integrated EMDR approach, participant comments during follow-up evaluations offered the assessor some knowledge of the procedure.

Another consideration is experimenter bias and demand characteristics. While the standard care medication group received only 10 to 15 minutes of consultation with a PCP and/or nurse, the integrated EMDR group received in most cases more time (mean = 28 minutes) with a psychologist who provided an individualized hands-on treatment that involved more direct attention to patient needs. Although standard doses of medications were used, there was no attempt to protocol individual PCPs prescribing practices; PCPs usually had a prior relationship with the migraine patients, but the psychologists administrating integrated EMDR had not had prior contact with these patients. This lack of

rapport with the integrated EMDR participants may have some treatment limiting or detrimental effect. This could be controlled in future studies by allowing treatment providers an equal amount of time with patients. While there were two psychologists providing the integrated EMDR treatment in this initial study, in future research it would be preferred that one of the treatment providers was not the researcher to prevent inadvertent patient demand characteristics or any experimenter bias.

Integrated EMDR is seen as a synergistic approach for aborting acute migraine. All three components were seen as necessary to create a positive treatment outcome. Future researchers may be interested in the roles that EMDR, head compression, and diaphragmatic breathing each play in the alleviation of migraine symptoms. For this, a specialized dismantling study would be necessary. There was no attempt in this study to dismantle the components.

As with many behaviorally based treatments, blinded studies are difficult to achieve. This study does, however, have randomized assignment to treatment, use of a replicable specific protocol for integrated EMDR, treatment fidelity (i.e., adherence to protocol checked before and during the study), clearly defined target symptoms (e.g., migraine pain), and assessor training in data capture.

While this initial report of migraine pain relief may be promising, more studies of integrated EMDR are needed. Future studies could include a head-to-head comparison of integrated EMDR to a single medication such as sumatriptan. In addition, future research may study the efficacy of phase 2 integrated EMDR, which utilizes the entire standard EMDR protocol to prevent or reduce migraine frequency, intensity, and duration. In phase 2, past migraine episodes are used as targets for EMDR intervention. The three-pronged EMDR protocol is used to treat possible migraine antecedents. After previous migraine episodes, migraine antecedents and fear of future migraines are treated with EMDR, a future template is constructed and installed to help reduce or prevent frequency and severity of future migraine attacks.

In summary, this study introduces integrated EMDR as a viable treatment for aborting migraine headaches. The pronounced and rapid pain relief of phase 1 of integrated EMDR posttreatment suggests that it can be an efficacious treatment regimen for aborting acute moderate to severe migraine. Although further study is warranted, integrated EMDR appears to be an effective, safe, and patient-friendly addition to current migraine treatment options.

References

American Psychiatric Association. (2004). Practice guidelines for the treatment of patients with acute stress disorder (ASD) and posttraumatic stress disorder (PTSD). *American Journal of Psychiatry, 161* (Suppl.), 1–57.

Andrade, J., Kavanagh, D., & Baddeley, A. (1997). Eye movements and visual imagery: A working memory approach to the treatment of post-traumatic stress disorder. *British Journal of Clinical Psychology, 36,* 209–223.

Barrowcliff, A. L., Gray, N. S., Freeman, T. C. A., & MacCulloch, M. J. (2004). Eye-movements reduce the vividness, emotional valence and electrodermal arousal associated with negative autobiographical memories. *Journal of Forensic Psychiatry and Psychology, 15,* 325–345.

Bisson, J., & Andrew, W. (2007). Psychological treatment of post-traumatic stress disorder (PTSD). *Cochrane Database of Systematic Reviews,* Issue 3, Article No. CD003388.

Boardman, H. F., Thomas, E., Milson, D. S., & Croft, P. R. (2006). The natural history of headache: Predictors of onset and recovery. *Cephalalgia, 26,* 1080–1088.

Brandes, J. L., Kudrow, D., Cady, R., Tiseo, P. J., Sun, W., & Sikes, C. R. (2004). Eletriptan in the early treatment of acute migraine: Influence of pain intensity and time of dosing. *Headache, 44,* 467–468.

Chabriat, H., Danchot, J., Michel, P., Joire, J. E., & Henry, P. (1999). Precipitating factors in headache: A prospective study in a national control-matched survey in migraineurs and nonmigraineurs. *Headache, 39,* 335–338.

Clouse, J. C., & Osterhaus, J. T. (1994). Healthcare resource use and costs associated with migraine in a managed healthcare setting. *Annals of Pharmacotherapy, 28,* 659–664.

Fernandez-de-las-Penas, C., Cuadrado, M. L., & Pareja, J. A. (2006). Myofascial trigger points: Neck mobility and forward head posture in unilateral migraine. *Cephalalgia, 26,* 1061–1070.

Goadsby, P. J. (2002). Migraine management: Contrasting patient preferences with current clinical end points: Introduction. *Headache, 42,* S1–S2.

Goslin, R. E., Gray, R. N., McCrory, D.C., Penzien, D., Rains, J., & Hasselblad, V. (1999). Behavioral and physical treatments for migraine headache. *Technical Review 2.2,* February. (Prepared for the Agency for Health Care Policy and Research under Contract No. 290-94-2025. Available from the National Technical Information Service; NTIS Accession No. 127946)

Grant, M., & Threlfo, C. (2002). EMDR in the treatment of chronic pain. *Journal of Clinical Psychology, 58,* 1505–1520.

Henryk-Gutt, R., & Rees, W. L. (1973). Psychological aspects of migraine. *Journal of Psychosomatic Research, 17,* 141–153.

Hu, X. H., Markson, L. E., Lipton, R. B., Stewart, W. F., & Berger, M. L. (1999). Burden of migraine in the United States: Disability and economic costs. *Archives of Internal Medicine, 159,* 813–818.

Jacobson, G. P., Ramadan, N. M., Aggarwal, S. K., & Newman, C. W. (1994). The Henry Ford Hospital headache disability inventory (HDI). *Neurology, 44,* 837–842.

Kavanagh, D. J., Freese, S., Andrade, J., & May, J. (2001). Effects of visuospatial tasks on desensitization to emotive memories. *British Journal of Clinical Psychology, 40,* 267–280.

Lipton, R. B., Diamond, S., Reed, M., Diamond, M. L., & Stewart, W. F. (2001). Migraine diagnosis and treatment: Results from the American Migraine Study II. *Headache, 41,* 638–645.

Lipton, R. B., Hamelsky, S. W., & Dayno, J. M. (2002). What do patients with migraine want from acute migraine treatment? *Headache, 42,* S3–S9.

Marcus, S., Marquis, P., & Sakai, C. (1997). Controlled study of treatment of PTSD using EMDR in an HMO setting. *Psychotherapy, 34,* 307–315.

Marcus, S., Marquis, P. & Sakai, C. (2004). Three and 6-month follow-up of EMDR treatment of PTSD in an HMO setting. *International Journal of Stress Management, 11,* 195–208.

Oldman, A. D., Smith, L. A., McQuay, H. J., & Moore, R. A. (2002). Pharmacological treatments for acute migraine: Quantitative systematic review. *Pain, 97,* 247–257.

Passchier, J. (2001). Psychological treatment of headache: Present and future. *Headache,12,* 109–112.

Penzien, D. B., Rains, J. C., & Andrasik, F. (2002). Behavioral management of recurrent headache: Three decades of experience and empiricism. *Applied Psychophysiology and Biofeedback, 27,* 163–181.

Ries, P. W. (1986). *Current estimates from the National Health Interview Survey, United States, 1984*. Series 10, No. 156 (DHHS Publication No. PHS 86-1584). *Vital Health Statistics*. Washington, DC: National Center for Health Statistics.

Robbins, L. (1994). Precipitating factors in migraine: A retrospective review of 494 patients. *Headache, 34,* 214–216.

Sack, M., Lempa, W., & Lamprecht, F. (2007). Assessment of psychophysiological stress reactions during a traumatic reminder in patients treated with EMDR. *Journal of EMDR Practice and Research, 1*, 15–23.

Schneider, J., Hoffman, A., Rost, C., & Shapiro, F. (2007). EMDR and phantom limb pain. *Journal of EMDR Practice and Research, 1,* 31–45.

Scopp, A. (1992). Headache triggers: Theory, research and clinical applications, part 1. *Headache Quarterly, 3,* 32–38.

Shapiro, F. (2001). *Eye movement desensitization and reprocessing: Basic principles, protocols and procedures* (2nd ed.). New York: The Guilford Press.

Shapiro, F. (2002). *EMDR as an integrative psychotherapy approach: Experts of diverse orientations explore the paradigm prism*. Washington, DC: American Psychological Association.

Sheffield, R. E. (1998). Migraine prevalence: A literature review. *Headache, 38,* 595–601.

Simons, D. G., Travell, J., & Simons, L. S. (1999). *Myofascial pain and dysfunction: The trigger point manual* (Vol. 1, 2nd ed.). Baltimore: Williams & Wilkins.

Stewart, W. F., Lipton, R. B., & Sawyer, J. (1998). A multinational study to assess the reliability of the Migraine Disability Assessment Score (MIDAS). *European Journal of Neurology, 5*(Suppl. 3), S7.

Stewart, W. F., Ricci, J. A., Chee, E., Morganstein, D., & Lipton, R. (2003). Lost productive time and cost due to common pain conditions in the US workforce. *Journal of the American Medical Association, 290,* 2443–2454.

Tfelt-Hansen, P., De Vries, P., & Saxena, P. R. (2000). Triptans in migraine: A comparative review of pharmacology, pharmacokinetics and efficacy. *Drugs, 60,* 1259–1287.

Van den Hout, M., Muris, P., Salemink, E., & Kindt, M. (2001). Autobiographical memories less vivid and emotional after eye movements. *British Journal of Clinical Psychology, 40,* 121–130.

Van der Kolk, B. A., Spinazzola, J., Blaustein, M. E., Hopper, J. W., Hopper, E. K., Korn, D. L., et al. (2007). A randomized clinical trial of eye movement desensitization and reprocessing EMDR, fluoxetine, and pill placebo in the treatment of posttraumatic stress disorder: Treatment effects and long term maintenance. *Journal of Clinical Psychiatry, 68,* 37–46.

Wilson, D., Silver, S. M., Covi, W., & Foster, S. (1996). Eye movement desensitization and reprocessing: Effectiveness and autonomic correlates. *Journal of Behavior Therapy and Experimental Psychiatry, 27,* 219–229.

Zanchin, G., Maggioni, F., Granella, F., Rossi, P., Falco, L., & Manzoni, G. C. (2001). Self-administered pain-relieving manoeuvres in primary headaches. *Cephalalgia, 21,* 718–726.

Zuercher-White, E. (1995). *An end to panic*. Oakland, CA: New Harbinger Publications.

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