

Acupuncture Treatment for Dry Eye

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ABSTRACT

Background: Acupuncture has been used to treat lacrimal insufficiency. Whether a single acupuncture treatment can address this condition has not been reported.

Objective: To evaluate the effectiveness of a single acupuncture treatment in reducing dry eye symptoms.

Design, Setting, and Patients: Seventeen patients with dry eye completed the Ocular Surface Disease Index (OSDI, a 12-item questionnaire designed to measure the severity of dry eye disease and the efficacy of dry eye treatments) before and one week after a single acupuncture treatment.

Intervention: The acupuncture treatment used in this study was a standardized protocol using a French Energetics Liver cerebral circulation circuit. Acupuncture points used were LR 3, LR 8, LR 14, GB 41, ST 1, GB 1, and BL 2 in all cases.

Main Outcome Measures: Comparisons of average pretreatment and posttreatment OSDI scores were made for the entire group and for subgroups.

Results: Of the 17 patients in this study, 15 (88%) showed improvement in OSDI results. The difference between the average pretreatment and posttreatment OSDI scores was 18.3, a 35% improvement ($P = .001$). Patients younger than 50 years had a greater degree of improvement, with an average decrease from pretreatment to posttreatment OSDI of 33.2, a 57% improvement ($P = .003$).

Conclusion: Acupuncture can be an effective treatment method for patients with dry eye and may be a useful adjunct to conventional dry eye therapy.

Key Words: Acupuncture, Dry Eye Syndromes, Xerophthalmia, Ocular Surface Disease Index (OSDI)

INTRODUCTION

LACRIMAL INSUFFICIENCY OR “DRY EYE” is a group of conditions characterized by disorder of the tear film leading to ocular discomfort.¹ Diagnosis of these conditions can be difficult because there is minimal overlap between symptoms and physical findings, and there is no diagnostic “gold standard.”² Many factors are known to be associated with lacrimal insufficiency including age, menopause, lupus, rheumatoid arthritis, Sjögren syndrome, ocular surgeries such as laser-assisted in-situ keratomileusis (LASIK), contact lens wear, and the use of medications such as antihist-

amines, antidepressants, oral contraceptives, and diuretics. Treatment of dry eye symptoms with tear substitutes, gels, ointments, and punctal plugs has varying success and can be frustrating for both patients and physicians.

Acupuncture has been used to treat lacrimal insufficiency. Nepp et al³ showed a statistically significant improvement in Schirmers test results, tear film break-up time, and eye drop use as a result of acupuncture treatment in 102 patients. In a case report of four patients, Niemtow et al⁴ showed a subjective increase in the tear pool in Sjögren syndrome.

We evaluated the effectiveness of a single session of acupuncture for the treatment of dry eyes.

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METHODS

The acupuncture treatment in this study was a standardized protocol using a French Energetics Liver cerebral circulation circuit.⁵ The rationale for this treatment approach was based on the Chinese Medicine concept that the Liver controls the eyes, as well as being based on anecdotal experiences of the authors. The specific acupuncture points used were LR 3, LR 8, LR 14, GB 41, ST 1, GB 1, and BL 2 in all cases. Sterile disposable acupuncture needles (0.25 mm diameter, 40 mm length, L type, Seirin-America Inc, Weymouth, MA) were inserted bilaterally at each of these points, and each needle was advanced to the depth required to elicit Qi. For ST 1 and GB 1, needle placement was just inside the orbital rim, and needle depth was approximately 15–25 mm in most cases. Electrical stimulation was applied to the needles using an electroacupuncture stimulation device (AWQ-104D, Lhasa-OMS, Weymouth, MA). The electrical leads were placed from LR 3 (negative) to LR 8 (positive), and from LR 14 (negative) to GB 1 (positive), bilaterally. Electrical stimulation was applied at a frequency of 4 Hz for a total of 15 minutes at a voltage that was palpable by the patient without being uncomfortable.

Dry eye symptoms for each patient were evaluated using

the Ocular Surface Disease Index (OSDI). The OSDI is a 12-item questionnaire designed by Allergan Inc (Irvine, CA) to measure the severity of dry eye disease and the efficacy of dry eye treatments. The OSDI responses yield a score from 0 to 100, with the following severity categories: 0–12 = normal tear function, 13–22 = mild dry eye, 23–32 = moderate dry eye, and 33–100 = severe dry eye. The OSDI has been shown to be valid and reliable in assessing the severity of dry eye disease; it correlates well with other subjective instruments.⁶

Patients completed the OSDI evaluation immediately prior to acupuncture treatment and again one week after treatment. The difference between the pretreatment and the posttreatment OSDI scores was obtained for each patient and was used to calculate a percentage improvement. The average pretreatment and posttreatment OSDI scores were compared using a paired *t* test. *P* < .05 was considered statistically significant for the purposes of this study.

Patients were chosen for the study based on a history of dry eye symptoms including dryness, foreign body sensation, stinging, burning, as well as the clinical impression of an ophthalmologist that the symptoms were due to dry eye. No attempt was made to categorize patients into subgroups such as evaporative or tear deficient. Patients were excluded from the study if their pretreatment OSDI scores indicated

TABLE 1. PATIENT DEMOGRAPHIC INFORMATION

Patient No.	Sex	Age, y	Medical and ocular history	Duration of dry eye	Medications
1	F	23	LASIK	1 year	Oral contraceptives
2	F	25	LASIK	4 years	Oral contraceptives
3	F	28	No medical problems	5 months	None
4	F	33	LASIK	4 years	None
5	F	34	LASIK, rheumatoid problems of unknown etiology	3 years	Oral contraceptives
6	F	40	Diabetes, hay fever	4 years	Insulin, cetirizine
7	F	42	Diabetes, hypertension, arthritis	5 years	Losartan plus hydrochlorothiazide, sertraline, estrogen
8	F	50	Corneal transplant OU	11 years	Fluoxetine, thyroid hormone, pravastatin, estradiol
9	M	52	Herpes zoster ophthalmicus	15 years	None
10	F	52	Osteoporosis, thyroid eye disease	3 years	Risedronate, thyroid hormone, hormone patch, beclomethasone
11	F	53	Arthritis, psoriasis, thyroid disease	5 years	Celecoxib, hormone therapy
12	F	54	Sjögren syndrome, punctal plugs	9 years	Thyroxin, ambryl, methotrexate, NSAID, risedronate, actorella
13	M	57	Phacoemulsification OU, punctal plugs OU	3 years	Amapro, cordura, omeprazole
14	F	61	Arthritis, depression	6 months	Atorvastatin, bupropion, estrogen, fluticasone, ibuprofen
15	F	69	Phacoemulsification OD, vitrectomy OS	11 years	Guanfacine, oxybutynin, moexipril, metoprolol, thyroid hormone, amlodipine, fluticasone
16	M	80	Arthritis	4 years	Losartan plus hydrochlorothiazide, sertraline, estrogen
17	F	80	Phacoemulsification OU, arthritis, atrial fibrillation	8 years	Digitalis

Abbreviations: NSAID, nonsteroidal anti-inflammatory drug; OD, right eye; OS, left eye; OU, both eyes.

TABLE 2. OSDI RESULTS AND SUBJECTIVE REPORT RESULTS

Patient No.	Pre OSDI	Post OSDI	OSDI improvement (%)	Duration of effect	18-Month subjective report (total No. of treatments received)
1	58.3	8.3	50.00 (85.8)	1 year	Complete relief, not using tears (1)
2	52	27	25.00 (48.1)	0	No improvement (1)
3	64.6	53.2	11.40 (17.7)	Unknown	Immediate improvement (1)
4	60.4	6.25	54.15 (89.7)	2 months	20% improvement (1)
5	62.5	35.4	27.10 (43.4)	6 months	Definite improvement, but not complete relief (1)
6	60.4	8.3	52.10 (86.3)	6 months	60% improvement, needs less tears (1)
7	47.9	35.4	12.50 (26.1)	6 weeks	Less dry (1)
8	68.75	68.75	0.00	1 week	60% improvement, no longer using drops (5)
9	43.75	39.6	4.15 (9.5)	6 months	Marked improvement, less tear use (2)
10	60.4	39.6	20.80 (34.4)	4 months	70% improvement, much improved, decreased redness and tearing (1)
11	14.6	6.25	8.35 (57.2)	1 month	Marked improvement (3)
12	77.1	62.5	14.60 (18.9)	2 weeks	Some improvement (2)
13	55	43.2	11.80 (21.5)	18 months	Helped a lot, 60% improvement (2)
14	64.5	58.3	6.20 (9.6)	0	No benefit of treatment (1)
15	25	25	0.00	0	Unsure if it worked (3)
16	25	16.6	8.40 (33.6)	1 week	Worked as well as artificial tears (2)
17	22.9	18.75	4.15 (18.1)	1 week	Worked as well as artificial tears (5)
Mean	50.8	32.5	18.3 (35.3)		

normal tear function (0-12). Written informed consent was obtained from each patient prior to enrollment in the study.

A total of 17 patients were enrolled in the study, ranging in age from 23-80 years (mean, 49 years). A summary of patients' age, sex, duration of dry eye symptoms, and pertinent medical and surgical history is provided (Table 1). Although our initial intent was to recruit patients with mild to moderate dry eyes, 13 of the 17 patients (76%) had pretreatment OSDI scores indicating severe dry eye symptoms.

Approximately 18 months after the initial acupuncture procedure, a follow-up subjective report was obtained from each of the patients by telephone. The interviewer inquired as to the amount of improvement in dry eye symptoms due to the acupuncture treatment and the duration of the treatment effect.

RESULTS

Of the 17 patients in this study, 15 (88%) showed improvement in their OSDI scores, while the other 2 patients

(12%) showed no change (Table 2). The difference between the average pretreatment and posttreatment OSDI scores for the entire group was 18.3, a 35% improvement ($P = .001$). For patients aged 50 years or older, the average decrease (improvement) from pretreatment OSDI to posttreatment OSDI was 9.6 (20.3% improvement, $P = .004$). For patients younger than 50 years, the average decrease from pretreatment OSDI to posttreatment OSDI was 29.0 (57% improvement, $P = .003$). The four young patients with dry eyes in the study caused by LASIK surgery had an average improvement in OSDI score of 39.06 (67% improvement, $P = .01$ (Table 3).

The subjective report obtained 18 months after the acupuncture procedure showed results similar to those of the OSDI (Table 2). Fourteen of the 17 patients (82%) reported improvement in their symptoms of varying degrees, with the effect of the single acupuncture session lasting from a week to as long as 18 months. However, these long-term results do not necessarily reflect the benefit of a single session of acupuncture, since eight of the 17 patients requested and re-

TABLE 3. CLINICAL SIGNIFICANCE OF TREATMENT EFFECT AS MEASURED BY NUMBER OF STANDARD DEVIATIONS OF IMPROVEMENT FROM BASELINE

Group	Mean pretreatment OSDI (SD)	Average improvement in OSDI	Improvement from baseline, in SD
All patients	50.8 (18.3)	18.3	0.8
Patients ≥ 50 years	45.7 (22.4)	9.6	0.43
Patients < 50 years	58.0 (5.7)	29.0	4.9
LASIK patients	58.3 (4.5)	39.1	8.7
Non-LASIK patients	48.5 (20.4)	11.9	0.58

ceived additional acupuncture treatment after the study treatment was completed.

DISCUSSION

Statistically significant improvement in dry eye symptoms with a single acupuncture treatment was observed for the patients in this study. Most of the patients (88%) receiving acupuncture treatment for dry eye showed improvement, and none of the patients had worsening of their symptoms. Most patients noticed significant subjective improvement following their acupuncture treatment, and most reported decreased need for artificial tears. This treatment effect lasted for varying amounts of time, with some patients reporting complete relief of symptoms for months following a single treatment. This treatment effect apparently can be reinforced by additional treatments.

Subgroup analysis is of limited utility for such a small sample size, but some trends can still be seen in these results. Age appeared to be a factor in the response to acupuncture for the treatment of dry eyes, with younger patients showing more improvement than older patients. Although the older patients had less improvement on the OSDI than the younger patients, the effect was still statistically significant for the older group and was subjectively beneficial for 8 of the 10 older patients. The patients with the greatest amount of improvement were those who had dry eye following LASIK. The four LASIK patients in this study all had symptoms that had persisted for more than a year following their refractive surgery, and all had marked relief of symptoms when measured one week after treatment.

The only clinically significant complication in our study was an eyelid ecchymosis in a 53-year-old woman following removal of the acupuncture needle at GB 1. Despite this cosmetically undesirable effect, the patient requested additional acupuncture treatments because of the marked subjective improvement she observed. Additionally, one patient experienced marked euphoria that required observation for approximately 20 minutes before allowing her to leave the clinic.

Although statistical significance can be a useful measure of the effectiveness of a medical intervention, it does not always indicate clinical significance, or whether the effect of the intervention is noticeable by the patient. A recent meta-analysis of studies concerning the minimal detectable change in health-related quality of life issues concluded that the threshold of discrimination is approximately one-half of a standard deviation.⁷ When the average measurement of a group changes by an amount equal to one-half of the standard deviation of the pretreatment measurement, that change is generally appreciable by patients. For our 17 patients as a group, the change was 0.8 standard deviations, which would be considered a noticeable treatment effect (Table 3). Younger patients responded better, with a change of 4.9

standard deviations for the group of patients younger than 50, and a change of 8.7 standard deviations for the post-LASIK dry eye patients.

This study is somewhat limited due to the lack of a control group to rule out placebo effect. However, since the primary goal of dry eye treatment is elimination of subjective symptoms, knowing the precise mechanism of action or contribution of the placebo effect may not be critical. Despite the small sample size of this study, results are both statistically and clinically significant. The acupuncture procedure described above appears to be effective and may be a useful adjunct in the treatment of dry eye symptoms, particularly in younger patients or in patients following refractive surgery.

CONCLUSIONS

In our series of 17 patients treated with acupuncture for dry eyes, most had improvement in their symptoms with a single treatment session. The treatment benefit was found to be both statistically and clinically significant with complete relief of symptoms for several months in some cases. Our results suggest that acupuncture is a useful treatment modality for patients with dry eye symptoms.

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