Efficacy of Intensive Acupuncture in Knee Osteoarthritis A Randomized Controlled Trials

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Introduction

Acupuncture is widely used for knee osteoarthritis (KOA), despite contradictory evidence of efficacy. The objective of this trial was to compare the efficacy of electro-acupuncture (EA) and manual acupuncture (MA) with sham acupuncture (SA) for KOA

Methods

In this multicenter trial, participants with KOA were randomly assigned to receive 24 sessions of EA, MA or SA over 8 weeks. Participants, outcome assessors and statisticians were masked to treatment group assignment. The primary outcome was the response rate at week 8, which is the proportion of participants who simultaneously achieved minimal clinically important improvement (MCII) in pain and function. The MCII in pain and function was set at 2 points on the 11-point numerical rating scale and 6 points on the Western Ontario and McMaster Universities Osteoarthritis Index function subscale, respectively. The efficacy analyses used the modified intention-to-treat population, which included all patients who were randomly assigned and had at least one post-baseline measurement. The ClinicalTrials.gov identifier is NCT03366363.

Results

Table 1. Baseline Characteristics of Participants in the Modified Intention-to-Treat Analysis

Characteristics	EA (N = 151)	MA (N = 145)	SA (N = 146)
Age, mean ± SD years	62.7 ± 6.6	63.0 ± 7.2	62.8 ±7.6
Female, no. (%)	119 (78.8)	111 (76.6)	106 (72.6)
BMI, mean ± SD kg/m^2 *	25.4 ± 2.9	25.1 ± 3.4	26.0 ± 3.5
Duration, mean ± SD years	6.0 ± 5.3	6.3 ± 5.6	7.5 ± 6.1
Radiological grade, no. (%)			
Grade Ⅱ	91 (60.3)	83 (57.2)	91 (62.3)
Grade Ⅲ	60 (39.7)	62 (42.8)	55 (37.7)
Affected knee, no. (%)			
Unilateral knee	14 (9.3)	17 (11.7)	17 (11.6)
Bilateral knees	137 (90.7)	128 (88.3)	129 (88.4)
Treatment in the past, no. (%) †			
Medication	73 (48.3)	85 (58.6)	60 (41.1)
Physical therapy	42 (27.8)	42 (29.0)	42 (28.8)
Acupuncture	14 (9.3)	10 (6.9)	15 (10.2)
Injections	7 (4.6)	8 (5.5)	7 (4.8)

* BMI, Body Mass Index (calculated as weight in kilograms divided by height in meters squared);
† Defined as treatments sought for knee pain previously. More than 1 subcategory type is allowed.

Between December 25, 2017 and October 10, 2018, a total of 480 participants were randomly assigned to the three treatment groups. Among these participants, 151 participants in the EA group, 145 in the MA group, and 146 in the SA group had at least one post-baseline measurement and were included in the primary analysis. At week 26, 407 (84.8%) participants completed the study. The baseline characteristics among three groups are similar and are shown in Table 1.

Table 2. Primary Outcomes in the Modified Intention-to-Treat Analysis

Outcomes	EA (n=151)	MA (n=145)	SA (n=146)	Pairwise Comparison *			
				EA vs SA		MA vs SA	
Response rate, No. (%)				Difference (97.5% CI)	P value	Difference (97.5% CI)	P value
Week 4	68 (45.0)	60 (41.4)	45 (30.8)	14.2 (1.7 to 26.7)	0.011	10.6 (-2.0 to 23.1)	0.059
Week 8	91 (60.3)	85 (58.6)	69 (47.3)	13.0 (0.2 to 25.9)	0.023	11.3 (-1.6 to 24.4)	0.051
Week 16	91 (60.3)	82 (56.6)	53 (36.3)	24.0 (11.4 to 36.6)	＜0.001	20.3 (7.4 to 33.1)	＜0.001
Week 26	86 (57.0)	76 (52.4)	50 (34.2)	22.7 (10.1 to 35.3)	＜0.001	18.2 (5.4 to 31.0)	0.002

* The significance level for primary outcome was adjusted at 0.025 for multiple comparisons using the Bonferroni method. Thus, the 97.5% CI were used for primary outcome.

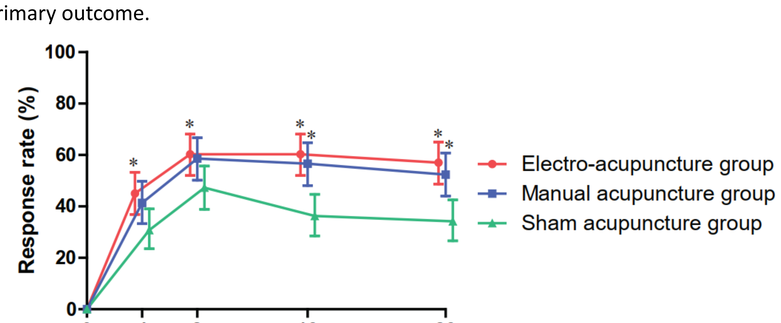

Figure 1.Trajectory of response rates over time Data presented as percentage of patients and error bars were 97.5% confidence interval. All p values are versus sham acupuncture. * represent p<0.025.

For the primary outcome, the response rates at week 8 were 60.3% (91/151 participants) in the EA group, 58.6% (85/145 participants) in the MA group, and 47.3% (69/146 participants) in the SA group. The between-group differences were 13.0% (97.5% CI, 0.2% to 25.9%; P = 0.0234) for EA vs SA and 11.3% (97.5% CI, -1.6% to 24.4%; P = 0.0507) for MA vs SA. The response rates in both EA and MA groups were significantly higher than the SA group at weeks 16 and 26 (Table 2). The trajectory of response rates over time is presented in Figure 1.

Table 3. Participant-Blinding Assessment

Treatment guess, n(%)	EA (n=151)	MA (n=145)	SA (n=146)	James Blinding Index (95%CI) *
Weeks 4				
'Electro-acupuncture'	11 (7.3)	30 (20.7)	29 (19.9)	0.64 (0.50 to 0.78)
'Manual acupuncture'	103 (68.2)	59 (40.7)	49 (33.6)	
'Sham acupuncture'	8 (5.3)	16 (11.0)	22 (15.1)	
'Unsure'	29 (19.2)	40 (27.6)	46 (31.5)	
Weeks 8				
'Electro-acupuncture'	11 (7.7)	31 (22.3)	33 (23.9)	0.63 (0.46 to 0.79)
'Manual acupuncture'	98 (68.5)	59 (42.4)	50 (36.2)	
'Sham acupuncture'	8 (5.6)	14 (10.1)	21 (15.2)	
'Unsure'	26 (18.2)	35 (25.2)	34 (24.6)	

* James blinding index range, 0-1; 0 indicates total absence of blinding, 1 indicates complete blinding, and 0.5 indicates completely random blinding.

Participants were unaware of assigned treatments at week 4 (James blinding index 0.64, 95% CI 0.50 to 0.78). The success of blinding was maintained at week 8 (James blinding index 0.63, 0.46 to 0.79; Table 3).

Conclusions

Among patients with KOA, compared with SA, intensive EA resulted in less pain and better function at week 8 and these effects persisted though week 26. Intensive MA had no benefit for KOA at week 8, although it showed benefits during follow-up.

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