Treatment of Lateral Epicondylitis with a Percussive Therapy Device: Midpoint Outcomes of a Randomized Controlled Trial

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INTRODUCTION:

Lateral epicondylitis (LE) or "tennis elbow" can be a significant cause of elbow pain in active individuals, athletes, and even those with sedentary lifestyles. Although LE is frequently self-limiting, symptoms can be treated with conservative management with variable effectiveness. Typical conservative management includes bracing to prevent further tendon irritation, NSAIDs, activity modification, and a focused occupational therapy program including stretching and eccentric strengthening. Corticosteroid injection in more severe cases can also be effective to relieve pain but requires a procedure and has been associated with poor long-term outcomes. Percussive therapy devices (PTDs) have been shown to improve pain by mobilizing the soft tissues which may cause biomechanical changes (i.e. reduction in muscle compliance), but also physiological (i.e. increased blood flow), neurological (i.e. reduction in perception of pain), and psychological changes (i.e. increased relaxation). However, clinical data supporting the use of PTDs in the setting of lateral epicondylitis treatment is limited. The purpose of the research is to analyze the effectiveness of a PTD to improve pain and restore functional outcomes in acute lateral epicondylitis (LE) or “tennis elbow”. We hypothesize that the percussive therapy devices (PTDs) will improve pain and functional outcomes compared to those without PTD with lateral epicondylitis at 12 weeks from the start of treatment.

METHODS:

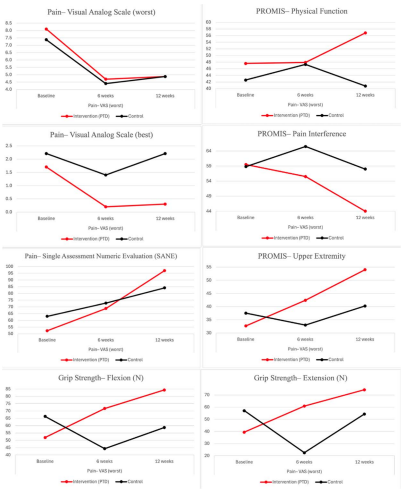
This is a single-site, prospective, randomized controlled trial. Adult patients (≥18 years) with clinically diagnosed atraumatic LE of <6 months duration were randomized to either an intervention group receiving occupation therapy (OT) plus home-based PTD use (daily, 3–7 minutes) or a control group receiving OT alone. Participants were assessed at baseline, 6 weeks, and 12 weeks. Validated outcome measures included grip strength (flexion and extension) and patient-reported outcome scores from the PROMIS Upper Extremity, Pain Interference, and Physical Function questionnaires, as well as patient-reported pain outcomes including the Visual Analog Scale (VAS) for best and worst pain and the Single Assessment Numeric Evaluation (SANE) scores. Midterm results are summarized from the first 34 enrolled participants (17 intervention and 17 control patients). Paired t-test was performed for each group (PTD and control) to assess patient reported outcome differences from baseline to 6-week and 12-week visits. Two-sample t-test was also performed to assess statistical differences between PTD intervention from control for patients diagnosed with atraumatic lateral epicondylitis.

RESULTS:

Patients enrolled in the PTD intervention group (n=17) demonstrated significant improvements from baseline to 12 weeks in the following outcomes (VAS-worst pain: −91%, 8.1 to 0.7, $p<0.01$), (SANE score: +85%, 52.3 to 97.0, $p<0.05$), (PROMIS Upper Extremity: +65%, 32.7 to 54.0, $p<0.05$), (PROMIS Pain Interference: −26% (59.5 to 44.0, $p<0.01$), (Grip Strength Flexion: +63%, 51.9N to 84.3N), and (Grip Strength Extension: +54%, 39.4N to 60.7N). Patients enrolled in the control group (n=17) demonstrated significant improvements from baseline to 12 weeks in only patient reported SANE scores (+34%, 63.0 to 84.8, $p<0.05$). In the control group, there were only modest improvements in the following PROMIS scores: Upper Extremity (+7%) and Pain Interference (-7%). At the same time, patients in the control group reported worst outcomes in grip strength for both flexion (–11%) and extension (–5%), in addition to decreased PROMIS physical function scores (–4%). These results are further supported by statistical differences between PTD intervention from control group in VAS pain scores ($p<0.05$), flexion and extension grip strength ($p<0.05$), and patient reported Pain Interference and Upper Extremity scores ($p<0.05$).

DISCUSSION AND CONCLUSION:

Interim results demonstrate that adjunctive use of a percussive therapy device in acute lateral epicondylitis significantly enhances pain relief, grip strength, and patient reported functional outcomes beyond occupational therapy alone. Notably, the intervention group showed improvements across all domains, with statistically significant improvements in pain scores (VAS and SANE), PROMIS scores (Upper Extremity and Pain Interference) and grip strength measures (flexion and extension). By contrast, the control group exhibited smaller, often nonsignificant, changes. These early findings suggest the promising efficacy of percussive therapy devices (PTDs) as an adjunct to musculoskeletal occupational therapy in the treatment of atraumatic lateral epicondylitis.



Percussive Therapy Intervention (n=17)						
		Baseline *avg scores*	**6 week (f/u)** *avg 46.5 days*	**STDev** *6 week*	**Δ (%change)** 0day vs 6wk	**Paired t-test** p<0.05
Pain	VAS-worst	8.1	4.7	2.8	-42%	**0.002**
	VAS-best	1.7	0.2	0.4	-88%	0.053
	SANE	52.3	68.8	22.0	32%	0.056
Grip Strength	Flexion (N)	51.9	71.7	25.0	38%	0.363
	Extension (N)	39.4	60.9	26.3	55%	0.179
PROMIS	Physical Function	47.6	47.9	9.6	0.6%	0.299
	Pain Interference	59.5	55.5	5.6	-7%	0.107
	Upper Extremity	32.7	42.4	11.5	30%	**0.002**

Percussive Therapy Intervention (n=17)						
		Baseline *avg scores*	**12 week (f/u)** *avg 94.9 days*	**STDev** *6 week*	**Δ (%change)** 6wk vs 12wk	**Paired t-test** p<0.05
Pain	VAS-worst	8.1	0.7	0.82	-91%	**0.000**
	VAS-best	1.7	0.3	0.82	-82%	0.363
	SANE	52.3	97.0	5.60	85%	**0.005**
Grip Strength	Flexion (N)	51.9	84.3	8.86	62%	0.329
	Extension (N)	39.4	74.3	17.45	89%	0.284
PROMIS	Physical Function	47.6	56.8	12.24	19.3%	0.062
	Pain Interference	59.5	44	6.35	-26%	**0.008**
	Upper Extremity	32.7	54	8.69	65%	**0.006**

Control Group (n=17)						
		Baseline *avg scores*	**6 week (f/u)** *avg 46.5 days*	**STDev** *6 week*	**Δ (%change)** 0day vs 6wk	**Paired t-test** p<0.05
Pain	VAS-worst	7.4	4.4	2.8	-40%	**0.009**
	VAS-best	2.2	1.4	0.4	-37%	0.109
	SANE	63.0	72.8	22.0	16%	0.704
Grip Strength	Flexion (N)	66.3	44.3	25.0	-33%	0.369
	Extension (N)	57.1	22.5	26.3	-61%	0.126
PROMIS	Physical Function	42.6	47.3	9.6	11.0%	0.533
	Pain Interference	58.8	65.5	5.6	11%	—
	Upper Extremity	37.5	33.0	11.5	-12%	—

Control Group (n=17)						
		Baseline *avg scores*	**12 week (f/u)** *avg 94.9 days*	**STDev** *6 week*	**Δ (%change)** 6wk vs 12wk	**Paired t-test** p<0.05
Pain	VAS-worst	7.4	4.9	3.23	-34%	0.089
	VAS-best	2.2	2.2	1.13	0%	0.103
	SANE	63	84.2	14.29	34%	**0.036**
Grip Strength	Flexion (N)	66.308125	58.7	28.72	-11%	**0.033**
	Extension (N)	57.12875	54.4	30.05	-5%	**0.048**
PROMIS	Physical Function	42.6	40.8	9.71	-4.2%	0.573
	Pain Interference	58.8	58.0	4.55	-1%	0.245
	Upper Extremity	37.53	40.3	11.42	7%	0.216

Percussive Therapy Intervention vs Control group				
		Two-sample t-test (p<0.05)		
		Baseline	**6-week**	**12-week**
Pain	VAS-worst	0.195	0.828	**0.007**
	VAS-best	0.457	0.159	0.670
	SANE	0.184	0.808	0.082
Grip Strength	Flexion (N)	0.223	0.066	**0.031**
	Extension (N)	0.166	**0.025**	0.129
PROMIS	Physical Function	0.104	0.897	0.064
	Pain Interference	0.752	0.351	**0.001**
	Upper Extremity	0.151	0.075	**0.033**