



# External Counterpulsation Therapy

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## Introduction

The ukactive Research Institute conducted a thorough systematic review of the scientific literature relating to the health outcomes of External Counterpulsation Therapy (ECP) Therapy. This safe, non-invasive treatment involves the sequential compression of the lower body in time with the cardiac cycle as a means of enhancing circulation and reducing cardiac workload. The review investigates the wider benefits of ECP Therapy as a treatment to increase activity in non-active and medical populations and enhance sports performance and training effectiveness.

## Key Findings

### Duration and intensity

Optimally full pressure ECP of 200-300 mmHg is more beneficial than sham (50-75 mmHg). Full pressure ECP having greater impacts upon circulation<sup>1</sup>, pain symptoms<sup>2</sup> and aspects of psychological well-being<sup>3</sup>. A fully completed course of ECP treatment involving 35 1-hour sessions, 5 days a week, over 7 weeks is found to have the most augmented health effects in comparison to those who have received shorter courses<sup>4</sup> or did not complete their treatment<sup>5</sup>.

### Success in various medical populations

ECP has been used as a successful health treatment in patients suffering from angina pectoris, stroke, heart failure (CHF), coronary artery disease (CAD) and diabetes. The standard full ECP treatment results in reduction of pain symptoms for those with angina<sup>6-8</sup> and stroke<sup>4,9</sup> which sustains for 3 to 6 months. ECP has also shown to enhance HRQoL<sup>8</sup>, and improve subjective assessment of pain, disability and depression<sup>10</sup> for patients with angina.

For those with CHR and CAD, ECP provides improvement in exercise duration in comparison controls<sup>11</sup>, including enhancing walking distances<sup>12</sup>. This may be associated to ECPs ability to enhance blood flow. Those with CHF show improvements in VO<sub>2</sub> max<sup>13</sup> and coronary perfusion through significant diastolic augmentation and systolic unloading<sup>8</sup>. Individuals with CAD indicate improved arm and leg blood flow<sup>14</sup>, and decreases in the arterial stiffness that reduces blood flow, in comparison to the sham pressure groups<sup>15</sup>.

## Impacts recovery and performance

ECP is also studied as a method of enhancing sports recovery and performance. Dominantly, ECP appears a suitable technique for use in elite sport, whereby 30 minute ECP sessions positively influences stress symptoms, improves recovery<sup>16</sup>, and reduces subjective perceptions of leg and upper body muscle soreness and well-being<sup>17</sup> of elite male rugby players.

Alongside, similar length ECP sessions coupled with conditioning training has enhanced rugby players leg power and accumulated peak power in comparison to controls, providing direct improvements on exercise performance<sup>18</sup>. In non-elite populations, maximum walking distance is enhanced<sup>12</sup> along with overall exercise tolerance post ECP treatment<sup>19</sup>. Collectively, research in both populations has led to the belief that ECP therapy exerts a 'training' effect<sup>19</sup>.

## Associated Risks

ECP is considered a non-invasive, alternative outpatient treatment for individuals who are not candidates for invasive procedures like surgery<sup>14</sup>.

Caution should be taken for those who have types of valvular heart disease (especially aortic insufficiency), for those with recent cardiac catheterisation, an irregular heart rhythm, significant blockages in the leg arteries, a history of deep venous thrombosis<sup>20</sup> and severe hypertension<sup>21</sup>.

## Conclusion

A majority of the literature around ECP Therapy demonstrates a positive outcome on treating those with variations of a cardiovascular disease, especially highlighting increased exercise tolerance and quality of life. More recent research provides clear indications that ECP Therapy has the potential to offer physiological benefits when used as part of a preventative model of healthcare delivery or sports recovery programmes. A number of active research projects are currently underway that may support these initial findings and demonstrate ECP's effectiveness as a preventative health treatment.

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