

## Section 2

## 09

## Physical Methods

## Wet-cupping Removes Oxidants and Decreases Oxidative Stress

Turkey

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## Summary

Wet-cupping therapy (WCT) is one of the oldest known medical techniques. Although it is widely used in various conditions such as acute or chronic inflammation, infectious diseases and immune system disorders, its mechanism of action is not fully understood. In this study, we investigated the oxidative status as the first step to elucidate its possible mechanisms of action.

Oxidative stress reflects an imbalance between the systemic manifestation of reactive oxygen species and a biological system's ability to readily detoxify the reactive intermediates or to repair the resulting damage. Disturbances in the normal redox state of cells can cause toxic effects through the production of peroxides and free

radicals that damage all components of the cell, including proteins, lipids and DNA.

The study population consisted of 31 healthy volunteers who undertook WCT. Venous blood samples and wet cupping (WC) blood samples were taken concurrently to assess oxidative stress, serum nitric oxide, malondialdehyde levels, and superoxide dismutase and myeloperoxidase activities were measured spectrophotometrically. WC blood had higher activity of myeloperoxidase, lower activity of superoxide dismutase, and higher levels of malondialdehyde and nitric oxide compared to venous blood. We can conclude that WC removes oxidants and decreases oxidative stress.

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## Background and Justification

The originality of our study is that we simultaneously measured all these parameters in wet cupping (WC) and venous blood samples of healthy people for the first time in the literature.

Cupping is a traditional therapy dating back at least 2000 years. There are many different cupping applications in practice such as needle cupping, moving cupping, retained cupping, medicinal (herbal) cupping and bleeding cupping (wet cupping). The latter is the most commonly used cupping procedures. Each type of cupping therapy may be used for different diseases or different treatment aims. In general, a glass cup is applied on the skin over an acupuncture point, painful area, or a reflex zone. This treatment creates a vacuum over certain points on the skin. Some researchers hypothesize that implementation of cups on selected acupoints on the skin provides a therapeutic effect by hyperaemia.

Wet-cupping has been claimed to drain excess fluids and toxins, loosen adhesions and lift connective tissue, bringing blood flow to skin and muscles, and stimulating the peripheral

nervous system. In addition, cupping is said to reduce pain and high blood pressure as well as to modulate neurohormones and the immune system. Cupping therapy is also used to improve subcutaneous blood flow and to stimulate the autonomic nervous system.

Free oxygen radicals formed during physiological and pathophysiological metabolism are balanced by a similar rate of their consumption by antioxidants. Although their excess production may cause oxidative damage of biological molecules, cell membranes and tissues, their generation is inevitable during certain metabolic processes.

Free radical-mediated oxidative damage has been implicated in the pathogenesis of a large number of diseases, including autoimmune diseases of endocrine glands, cancer, inflammatory diseases, cardiovascular disease (including atherosclerosis, hypertension, ischaemia/reperfusion injury), diabetes mellitus, neurodegenerative diseases (Alzheimer's disease and Parkinson's disease), rheumatoid arthritis, and ageing. A recent study showed that cupping had therapeutic effects on myocardial infarctions and cardiac arrhythmias in rats. Another recent study also investigated the possible useful effects of cupping therapy on cardiac rhythm in terms of heart rate variability (HRV). All HRV parameters in healthy persons improved after cupping therapy compared to those measured before cupping therapy, suggesting that cupping might be cardio-protective. It is suggested that cupping therapy restored sympathovagal imbalances by stimulating the peripheral nervous system.

These examples demonstrate the wide application of WC in cases associated with oxidative damage.

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## Description

For this study, WC therapy was applied to 31 healthy volunteers, 15 females and 16 males; aged 21-40 years (mean age  $30.24 \pm 9.53$  years). Written informed consent was obtained from each participant and the study protocol was accepted by the local ethics committee.

To assess oxidative stress, serum nitric oxide, malondialdehyde levels as well as activity of superoxide dismutase and myeloperoxidase were measured spectrophotometrically. WC blood exhibited higher myeloperoxidase activity, lower superoxide dismutase activity, higher levels of malondialdehyde and nitric oxide compared to venous blood. WC removes oxidants and decreases oxidative stress.

For the cupping therapy, sterile 5 cm diameter disposable cups were used. Five points of the posterior neck, bilateral perispinal areas of the neck and thoracic spine were selected for treatment (Fig. 1). The same points were cupped in all participants. The application

areas were first cleaned with antiseptic solution. Cups were then placed on these points and negative pressure applied using a cupping pump. The cups were removed after 2-3 minutes. Then, the skin was then punctured to a depth of 2mm within the cupping sites using 26-gauge disposable lancets. After this, vacuum pumping was re-applied and 3-5 cm<sup>3</sup> of blood was drained per cupping site. The application sites were then covered with sterile pads. No adverse reaction was experienced but as fainting due to intolerance to pain was possible, a doctor, a nurse and emergency response kit and stretcher were kept ready in the treatment room.

Venous blood samples were collected after overnight fasting and just before WC implementation. WC blood samples were taken from the cups after bleeding and vacuum applications. The serum fraction was obtained by centrifugation and stored at -80 °C until analysis.



**Figure 1:** Points chosen for wet-cupping (WC) therapy.

## Results

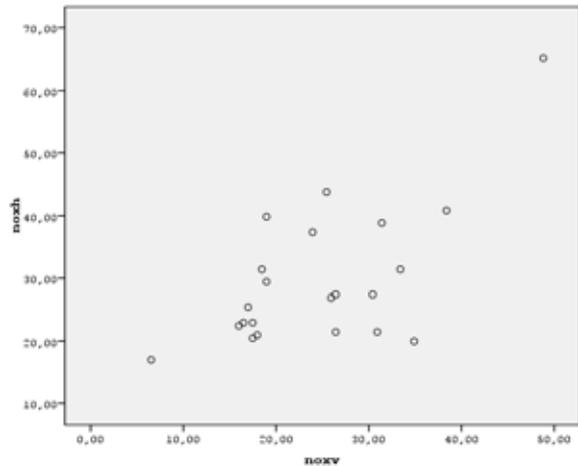
Significant differences were found between the levels of malondialdehyde and nitrite/nitrates in WC compared to venous blood (Table 1). Likewise, myeloperoxidase activity was significantly increased in WCT, but no differences were detected in superoxide dismutase activity.

	Venous	Wet cupping	t	p
MDA level (nmol/L)	16.31±3.78	21.34±8.8	2.81	0.009
NO <sub>x</sub> level (μmol/L)	25.55±9.65	30.01±11.9	2.88	0.007
MPO activity (U/mL)	33.01±22.41	68.93±40.7	4.9	0.000
SOD activity (U/mL)	45.66±5.46	41.14±12.8	2.15	0.04

Results are expressed as mean ± SEM

MDA, malondialdehyde; NO<sub>x</sub>, nitrite + nitrate; MPO, myeloperoxidase; SOD, superoxide dismutase

**This graph shows positive correlation between venous and wet cupping blood NO levels**



**Table 1:** Concentrations of oxidative status markers in blood taken from veins and wet cupping (WC) sites (n = 31).

## Impact

Although our research is at an early stage, preliminary results have been published in a peer-reviewed journal.

## Lessons Learned

We could not evaluate the levels of oxidative stress parameters in venous blood following WCT employment because second venous samples were not taken. Furthermore, all volunteers in our study group were healthy so we could not assess the effect of WCT on any diseases related to oxidative stress. We emphasize that more extensive studies with a broader study population should be carried out to further determine the effect of WCT on oxidative status.

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## Future Plans

In order to continue our work more efficiently within Turgut Ozal University, the establishment of a Complementary Medicine Institute has been proposed and the university is making preparations for its establishment.

Our academic research is ongoing and we are working on publishing our findings, although we have not yet begun cooperating with researchers in other countries.

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## Publication

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