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## REVIEW

# New is the well-forgotten old: The use of dry cupping in musculoskeletal medicine

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**Summary** Cupping is an ancient technique used in treating pain and various disorders. Different techniques have been developed over time, however, applying a cup to create suction over a painful area, is common to all. Dry or fire cupping, used on the intact skin, leaves bluish circular hematomas. Recently, interest in cupping has re-emerged and subsequently, several studies have begun to investigate the mechanisms of cupping therapy. Mechanically, cupping increases blood circulation, whereas physiologically it activates the immune system and stimulates the mechanosensitive fibers, thus leading to a reduction in pain.

There is initial scientific evidence that dry cupping is able to reduce musculoskeletal pain. Since cupping is an inexpensive, noninvasive and low-risk (if performed by a trained practitioner) therapeutic modality, we believe that it should be included in the arsenal of musculoskeletal medicine. It is essential to perform additional studies clarifying the biological mechanism and clinical effects of cupping.

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## History: cupping therapy in different cultures

Cupping has been practiced in most cultures in one form or another throughout history but the true origin of cupping

therapy remains uncertain. Although it is believed that cupping therapy dates back to as early as 3000 B.C.E., the earliest record describing cupping as the removal of “foreign matter” from the body was found in the Egyptian Ebers Papyrus in 1550 B.C.E. (Nickel, 2005). Subsequently, cupping was introduced to the Greeks and eventually spread to many other countries in Europe and America. Cupping was practiced by many famous physicians such as Galen (131–200C.E.), Paracelsus (1493–1541) and Ambroise Pare (1509–90), in addition to other practitioners including barber surgeons and bath house attendants

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(Chirali, 1999). Cupping was widely used into the late 1800's by European and American physicians (Turk and Allen, 1983). In the Soviet Union, cupping was in practice until the late 20th century (Pokrovski, 1991).

The clinical efficacy of cupping was confirmed by a joint research project between Chinese and Russian acupuncturists (Chirali, 1999). Since 1999, cupping has been accepted as an official therapeutic practice in Chinese hospitals. A Korean survey in 2006 showed that 93.5% of 6708 oriental physicians used cupping treatments in their clinical fields (Han et al., 2006).

Although cupping is practiced in Eastern and Western cultures, the theories and basis for its application differ. Eastern medicine believes that diseases are caused by stagnant or blocked Qi, the life force; cupping is able to unblock and correct imbalances in the flow of Qi, thereby, leading to a greater well-being (Tham et al., 2006). Galen's teachings regarding four basic body fluids (humors) were used as a theoretical background for cupping. Greek physicians believed that the cupping drew pathogenic features to the surface, thus, facilitating their elimination (Kose et al., 2006). Medieval European practitioners used cupping as a means of expelling evil spirits.

In 1920, Epstein proposed a "counter-irritation" explanation, referring to cupping as a process of transferring discomfort and pain from one site to another thereby curing the original site (Epstein, 1920). A psychosomatic theory advocated by several researchers hypothesized that the therapeutic effect of cupping could be attributed purely to a placebo effect (Kouskoukis and Leider, 1983; Yoo and Tausk, 2004).

Although cupping was used to treat pain and a variety of other complaints for thousands of years, it nearly disappeared from the therapeutic spectrum of Western medicine during the late 20th century. Nevertheless, during the past few years, interest in cupping has increased and new clinical trials suggest that cupping may be effective in managing painful conditions (Farhadi et al., 2009; Kim et al., 2011; Lütke et al., 2006).

Numerous investigations and review papers have begun studying *wet cupping* (that including small incisions made on the skin to cause bleeding). This method is invasive and cannot be performed by most practitioners who deal with musculoskeletal disorders (physical therapists, osteopaths, massage therapists, etc.). Our review concentrates on *dry cupping*, a noninvasive procedure, that if found effective can be easily included in the arsenal of therapies focusing on musculoskeletal disorders.

## Methods of cupping

Cupping is traditionally performed by using a small round cup made of thick glass with a rolled rim to ensure uniform and air-tight contact with the skin in order to preserve a vacuum effect (Kravetz, 2004). Cups are also made of bamboo, earthenware and other materials. Negative pressure is created by heating the air within the cup, then allowing it to cool and contract while in contact with the skin. The air is heated either by swabbing the interior of the cup with alcohol then setting it aflame or by igniting an alcohol-soaked cotton ball or other flammable

materials held inside the cup (Kravetz, 2004; King and Davis, 1983; Kouskoukis and Leider, 1983; Look and Look, 1997). Just before the flame is extinguished, the mouth of the cup is positioned firmly against the skin at the desired location. The suctioning effect produced by the vacuum anchors the cup onto the skin, drawing it upwards into the cup. Today, cupping is frequently carried out using plastic cups and a manual hand-pump to create the vacuum. To cover a wider area, lubricants can also be used to move the cup around once placed on the skin (Turk and Allen, 1983).

The most common sites of application are the back, chest, abdomen and buttock — areas of abundant muscle (Yoo and Tausk, 2004). Traditionally, cupping is performed in sets of four, six or 10. The cups are typically left in place for 5–20 min or more. The longer a cup is left on the skin, the more of a circular mark is created (Kouskoukis and Leider, 1983).

The after-effects of cupping include erythema, edema, and ecchymosis in a characteristic circular arrangement. These bruises may take several days to several weeks to diminish (Yoo and Tausk, 2004; Manber and Kanzler, 1996). Cupping has unique morphologic features. Family physicians and dermatologists should be made aware of this technique as it is becoming more and more widespread.

## Mechanical effects of cupping

Tham et al. (2006) demonstrated in a soft tissue model that the soft tissue directly under the rim of the cup compresses, while the periphery tenses. The tensile stresses appear to be greater in the bulb-shaped region under the center of the cup, extending down to the muscle layer. However, these forces reach their maximum on a very small area of the skin layer near to and just inside the cup's rim. This is probably caused by the stretching of the skin and the underlying soft tissue layers when drawn into the cup by the applied vacuum.

The cups typically used for cupping, range in diameter from approximately 38 mm–50 mm. Tham et al. (2006) observed that maximum stress was found in a larger cup and minimum stress in a smaller cup, located along the axis passing through the center of the cup. Therefore, it may be assumed that a small cup will not be able to exert the force required to make any difference. For constant vacuum pressure, a larger cup is able to exert a higher stress at the interface between the fat and muscle layers. These results are consistent with the experimental data reported by Hendriks et al. (2006) in a study describing the mechanical behavior of the skin using different diameter suction devices. Hendriks's data clearly show that increasing the diameter of the suction device leads to larger skin-surface displacements, resulting in a correspondingly larger uplift and resulting stress at the underlying tissue layers.

The larger compressive stresses were found associated with a sharper cup rim which caused more pain and discomfort to the patient (Kravetz, 2004). It was therefore, recommended that cups with more rounded rims should be used (Kravetz, 2004). This rounded rim is commonly referred to as a rolled rim or rolled edge.

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