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Cupping — Is it reproducible? Experiments about factors determining the vacuum

R. Huber [a,*], M. Emerich [a], M. Braeunig [b]

[a] Center for Complementqry Medicine, Department of Environmental Health Sciences, University Hospital Freiburg, Breisacher Str. 115b, D-79106 Freiburg, Germany
[b] Academic Section Evaluation of Complementary Medicine, Department of Environmental Health Sciences, University Hospital Freiburg, Breisacher Str. 115b, D-79106 Freiburg, Germany
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Summary
Objectives: Cupping is a traditional method for treating pain which is investigated nowadays in clinical studies. Because the methods for producing the vacuum vary considerably we tested their reproducibility.
Methods: In a first set of experiments (study 1) four methods for producing the vacuum (lighter flame 2 cm (LF1), lighter flame 4 cm (LF2), alcohol flame (AF) and mechanical suction with a balloon (BA)) have been compared in 50 trials each. The cupping glass was prepared with an outlet and stop-cock, the vacuum was measured with a pressure-gauge after the cup was set to a soft rubber pad. In a second series of experiments (study 2) we investigated the stability of pressures in 20 consecutive trials in two experienced cupping practitioners and ten beginners using method AF.
Results: In study 1 all four methods yielded consistent pressures. Large differences in magnitude were, however, observed between methods (mean pressures -200 ± 30 hPa with LF1, -310 ± 30 hPa with LF2, -560 ± 30 hPa with AF, and -270 ± 16 hPa with BA). With method BA the standard deviation was reduced by a factor 2 compared to the flame methods. In study 2 beginners had considerably more difficulty obtaining a stable pressure yield than advanced cupping practitioners, showing a distinct learning curve before reaching expertise levels after about 10—20 trials.
Conclusions: Cupping is reproducible if the exact method is described in detail. Mechanical suction with a balloon has the best reproducibility. Beginners need at least 10—20 trials to produce stable pressures.

Introduction

Cupping has worldwide been used in traditional medicine systems and is also nowadays used as complementary or alternative therapy especially in patients with pain syndromes. Recent clinical studies have reported efficacy in patients with brachialgia paresthetica nocturna, carpal tun-

* Corresponding author. Tel.: +49 761 270 8201; fax: +49 761 270 8323.
E-mail address: roman.huber@uniklinik-freiburg.de (R. Huber).

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nel syndrome, cancer pain and lower back pain.[1–4] The principle is a sucking method. The cupping glass is applied to the skin, mostly to parts of the back of the patient. Because of the vacuum, the skin is sucked into the cupping glass, becomes red and warm, and shows, when the vacuum is strong, signs of sub- and/or intracutaneous bleeding (petechiae). Furthermore, moisture is sucked out of the skin and, in case of wet-cupping, blood is collected in the cupping glass.

In our own team with 6 physicians who all are hold of a certification in Complementary Medicine from the German Physicians Organization, four different methods of generating the vacuum were known from different schools and experiences. These included

- holding a lighter flame close to the opening of the cupping glass for 2—3 s and then rapidly putting the glass onto the skin (method lighter flame, LF)
- holding a lighted alcohol soaked swab close to the opening of the cupping glass for 1—2 s and then rapidly putting the glass onto the skin (method alcohol flame, AF)
- mechanical suction by squeezing a rubber balloon which is attached to the cupping glass (method balloon, BA)
- lighting a small, alcohol moist cotton piece which is affixed to the inner side of the cupping glass and stops burning when the oxygen is consumed after putting the cupping glass onto the skin

The last method was not used in our department because of the potential risk of burning the patients. The three other methods were regularly used.

In clinical practice, cupping is performed according to the individual response and susceptibility of the patient: if they feel pain, the negative pressure has to be diminished. Nevertheless, it is important to know the strength of the vacuum to reproduce the intensity of cupping in individual treatments or clinical studies. We, therefore, wondered, whether the sucking effect of the different methods is comparable, assuming that the effect on the skin (redness, warmth, effusion) is closely related to the strength of the vacuum and this, in turn, is related to the clinical effect. To our knowledge, no literature exists about the strength of the vacuum (negative pressure) in relation to the method of cupping.

From theoretical considerations two main factors are determining the pressure in the cupping glass: (a) the exact method by which the air in the cup is evacuated and (b) the handling by which the cup is set to the patient. Therefore, we systematically investigated the achievable negative pressure in the cupping glass in relation to different methods of cupping. As the handling of the cup and flame requires some experience, we investigated in a second set of experiments how much training is needed to obtain a strong and constant negative pressure.

Materials and methods

Aim of the study

In order to evaluate the factors, which determine the vacuum during cupping, we performed two experimental studies. In study 1 we determined the maximum achievable negative pressure with 4 different methods of producing the vacuum. In study 2 we investigated the individual ability to achieve a constant strong vacuum with method AF in experienced cupping practitioners compared to beginners, who never before had performed cupping. The main question in this second study was, whether or not there is a learning curve for obtaining a constant strong vacuum.

Study design

Study 1 compared four different methods with repeated measurements. One experienced cupping practitioner performed predefined 50 cupping trials on a soft rubber pad with each of the four methods, trying to achieve maximum negative pressure in each experiment.

Four ways of generating the vacuum have been compared:

1. the flame (2 cm in length) of a pocket lighter (butane gas) was held close to the opening of the cupping glass for 2—3 s (LF1)
2. the flame (4 cm in length) of a utility lighter (butane gas) was held close to the opening of the cupping glass for 2—3 s (LF2)
3. a burning alcohol (Softasept, 74,1% ethanol, 10% 2-propanol, water) soaked cotton swab was held close to the opening of the cupping glass with a needle holder for 1—2 s (AF)
4. mechanical suction by manually squeezing twice a rubber balloon (volume 60 ml) attached to the outlet of the cupping glass (BA)

Study 2 compared a cohort of 10 beginners (8 women, 2 men, mean age 24 years, 5 third and fourth year medical students, 5 students of other faculties) with 2 experienced cupping practitioners (2 men, mean age 36 years), each performing predefined 20 cupping experiments in series with method AF on the soft rubber pad.

Each time after setting the cupping glass the pressure was measured and documented. Zero values were counted as missing. The instruction to all participants was to reproduce a stable and strong vacuum.

Selection of probands

Proband for study 1 was an experienced cupping practitioner of the Center for Complementary Medicine of the University Hospital Freiburg.

Probands for study 2 were the two most experienced cupping practitioners of the Center for Complementary Medicine of the University Hospital Freiburg and 10 students from Freiburg University who were recruited by oral announcement. They never had performed cupping before and voluntarily participated in the study without financial compensation.

Experimental setting

In order to get access to the gas volume inside the cupping glass, we flanged a single-way stopcock with solid glass key