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Review Article

Pressure Levels in Cupping Therapy: A Systemic Review

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ABSTRACT

This is a systematic review of the clinical use of cupping therapy. Four domestic databases and 2 foreign databases were searched. Studies that reported the cupping pressure used during cupping therapy were included in this study. The types of cupping, cupping site, pressure, and duration of cupping were the main parameters analyzed. A total of 27 studies, including 24 experimental studies were analyzed. There were 12 constant negative pressure (domestic) studies with a range between 60 mmHg and 600 mmHg. There were 5 maximum negative pressure (domestic) studies and the maximum negative pressure was 620 mmHg. Three studies used a maximum negative pressure of 600 mmHg. There were 4 constant negative pressure (foreign) studies with a range between 75 mmHg to 750 mmHg. There were 3 maximum negative pressure (foreign) studies with a maximum pressure of 420 mmHg. The studies differed with regards to the materials used and the amount of pressure applied. Many studies had limited information and therefore generalizability of the results in this review is limited. Further experimental studies are required to establish the correlation between cupping pressure and treatment effects so that cupping therapy can be standardised.

Introduction

Cupping therapy is a treatment to release toxins from the body by using special cups to generate suction and adsorption at the surface of the skin. Both Eastern and Western countries have used cupping therapy since ancient times, and in Korea, the practice of cupping is included in Donguibogam [1].

Cupping therapy is simple, safe, and very effective. Given the simplicity of cupping treatment it can be used in clinical practice and its wider clinical applications, and it is now used regularly in modern medicine [2].

Cupping therapy has been covered as a medical procedure by the National Health Insurance in Korea since 1987. It is used as a treatment for various diseases, and many studies have been conducted on the efficacy of cupping therapy [3]. However, research on the effectiveness of treatment according to cupping pressure is insufficient, so cupping therapy remains non-standardised. As there are no clear criteria for pressure settings during cupping therapy, scientists are conducting research in a random manner and clinicians are using cupping in various ways in clinical practice. In this study, we aimed to review the body of evidence detailing the cupping pressure used, with a view to standardising the practice of cupping therapy.

Materials and Methods

Research method

Database search

The following domestic (Korean) academic databases were searched: Korean Information Service System (KISS), National Securities Depository Ltd. (NDSL), Regional Information Sharing Systems (RISS), and DBpia. The following foreign databases were also searched: National Center for Biotechnology Information (NCBI) PubMed, Excerpta Medica database (EMBASE).

Search words

The search words are shown in Fig. 1.

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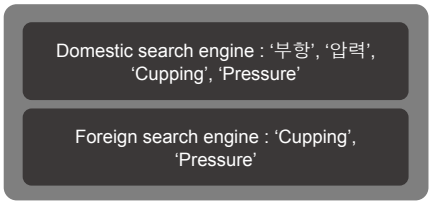

Fig. 1. The search words used in domestic and foreign search engines.

Search period and method

The search period for domestic studies was inclusive until June 30, 2019 and included both dissertations, and studies published in academic journals. The search period for foreign studies was inclusive until June 30, 2019 using the search criteria "humans, English".

Fig. 2 shows the flow chart of study selection. One researcher conducted the search and produced the results, and another researcher reviewed them and agreed on the final studies for inclusion in this review. These studies were checked to ensure that they conformed to the study topic, and duplicate studies were excluded.

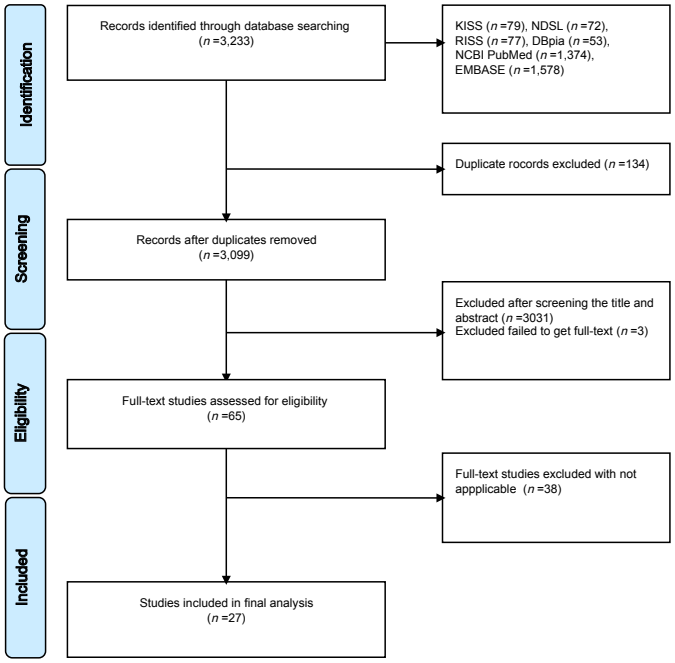

Fig. 2. Flow chart of study selection.

Search results

A total of 27 studies were selected out of 65 studies that were retrieved in accordance with the search criteria, with the exception of those studies that did not include the pressure used during cupping, and those studies that were duplicates.

Results

Characteristics of research studies

The characteristics of the included studies are summarized in Table 1 (domestic) and Table 2 (foreign).

In the domestic research studies, manual and plastic cupping devices were the most common types. The most common cupping site was the back. The number of studies that used silicon rubber plates increased after 2008. The thickness of silicon rubber sheets varied between 3 mm and 10 mm. Cupping pressure varied between 60 mmHg and 600 mmHg. The duration of cupping was between 1 minute and 20 minutes (Table 1).

In the foreign research studies, the most common types of cupping devices were motor-operated cups and glass cups. The most common cupping site was the lower back. The cupping pressure ranged from 60 mmHg to 750 mmHg (100 kPa). The cupping duration ranged between 6 minutes and 20 minutes (Table 2).

The biggest difference between the domestic and foreign studies was regarding the type of cupping device used.

The criteria to classify constant pressure or maximum pressure in the research articles included in this review, was according to the content of the article. If recorded measurements were up to the maximum pressure, it was classified as maximum pressure. Without any records of maximum pressure, if there were measurements taken at a specific pressure for specific time, it is classified as constant pressure (Tables 3-6).

Classification by year

Of the 27 total studies, 19 (70.4%) were domestic and 8 (29.6%) were foreign. Domestic studies that contained details of cupping pressure showed a frequency of 3 in 2008, 1 in 2009, 3 in 2010 and 2 in 2011 and the numbers of studies declined after 2013. Foreign studies showed an increase from 1 study before 2010, to 7 studies after 2010 (Fig. 3).

Categorisation by pressure

Domestic research - constant negative pressure

The constant negative pressure in the studies by Im and Moon [5], Park and Lee [7], Kweon et al [9], and Lee et al [10] was 60 mmHg. The constant negative pressure was 225 mmHg in the study by Kim et al [15], 240 mmHg in the study by Shin et al [6], and 400 mmHg in the study by Oh and Kim [8]. In comparison, the constant negative pressure in the studies by Shin [4], Ryu et al [11], Kim et al [16], Kim et al [18], and Kim et al [20] was 600 mmHg (Table 3).

In the 12 domestic studies, there were 5 studies that used 600 mmHg, 4 that used 60 mmHg, 1 that used 225 mmHg, 1 that used 240 mmHg, and 1 that used 400 mmHg. Reports that included the diameter and volume of the cups were insufficient.

Domestic research - maximum negative pressure

The maximum negative pressure in the studies by So et al [12] and Kim et al [20] was 300-400 mmHg for cup size 1. Size 1, 2, 3, 4 and 5 cups have the same diameter. The maximum negative pressure in the studies by Kim et al [13], Yi et al [14] and Yi et al [17] was 550-650 mmHg (Table 4).

In the 5 domestic studies, the maximum negative pressure was 550-650 mmHg in 3 studies, and 300-400 mmHg in 2 studies. Very few studies reported on the volume of the cups.

Table 1. Summary Characteristics of Included Studies (Domestic).

First author (y)	Cupping device type	Cupping position	Cupping pressure (mmHg)	Cupping duration (min)
Shin [4] (1979)	Cupping device Cups	Shuxue points of 12 meridians	Constant negative pressure: 600	1
Im [5] (1980)	Electronic cupping device Glass cups	Back-shu point	Constant negative pressure: 60	1
Shin [6] (1988)	Cupping device Ceramic cups	Back	Constant negative pressure: 240	1-3
Park [7] (1995)	Electronic cupping device Cups	Back	Constant negative pressure: 60	1
Oh [8] (1999)	Cupping device Cups	Back, abdominal area	Constant negative pressure: 400	5
Kweon [9] (2002)	Cupping device Cups	Back	Constant negative pressure: 60	5
Lee [10] (2002)	Cupping device Plastic cups	Chest, shoulder, upper extremity, hands	Constant negative pressure: 100–200	20
Ryu [11] (2006)	BUDDEUMI		Constant negative pressure: 600	
Sho [12] (2008)	Manual cupping device Plastic cups	Silicone rubber pad Thickness: 10 ± 1 mm Area: 100 × 100 mm	Maximum negative pressure Size 1 (B: 397.28 / C: 362.36) Size 2 (A: 342.51 / B: 444.23) Size 3 (A: 365.56 / B: 466.50 / C: 423.10) Size 4 (A: 391.34 / B: 481.49 / C: 450.87) Size 5 (B: 510.28 / C: 464.83)	5
Kim [13] (2008)	Manual cupping device Plastic cups	Danjeon (lower part of the abdomen) area, shoulder area	Maximum negative pressure: 580–620	
Yi [14] (2009)	Electronic cupping device Cups	Silicone rubber pad Thickness: 3 ± 0.5 mm Area: 100 × 100 mm	Maximum negative pressure: 600 ± 10%	10
Kim [15] (2010)	Negative pressure control device	Midway between xiabai (LU4) and chize (LU5) of lung meridian (LU)	Constant negative pressure: 30 kPa (225 mmHg)	5
Kim [16] (2010)	Surface meridian/acupoint energy measurement system	Back-shu point of bladder meridian (BL)	Constant negative pressure: 80 kPa (600 mmHg)	5
Yi [17] (2010)	Electronic cupping device Cups	Silicone rubber pad Thickness: 3 mm Area: 100 × 100 mm	Maximum negative pressure Seo-ryong (600) Noel (600) Hansol (550) G.O.P.O. (570) Seoul Medical (540)	10
Kim [18] (2011)	Measurement system for changes in meridians	Back-shu point of bladder meridian (BL)	Constant negative pressure: 80 kPa (600 mmHg)	1
Kim [19] (2013)	Electronic cupping device Cups	Back-shu point of bladder meridian (BL)	Constant negative pressure: 80 kPa (600 mmHg)	1
Kim [20] (2018)	Manual cupping device Cups Wet cupping	Silicone rubber pad Thickness: 3 mm Area: 100 × 100 mm	Maximum negative pressure Dongbang: Size 1 (323.2 ± 9.8) DE Medical: Size 1 (318 ± 7.0) Hansol: Size 1 (381.8 ± 13.4) Daegun: Size 1 (322.4 ± 9.8)	10

Foreign research - constant negative pressure

The constant negative pressure in the study by Blunt and Lee [22] was 75-150 mmHg, and 75 mmHg, 225 mmHg, and 375 mmHg in the study by Tham et al [21]. The constant negative pressure in the study by Teut et al [27] was 112.5-262.5 mmHg, and 750 mmHg in the study by Blunt and Lee [22] (Table 5).

There were 4 foreign studies using constant negative pressure. There were insufficient reports on the diameter and volume of cups in the foreign studies.

Foreign research - maximum negative pressure

The maximum negative pressure in the study by Huber et al [23] was 420 mmHg using the Alcohol Flame (AF) method. It was 236.3 mmHg in the study by Emerich et al [25] using the Healthy Volunteers (HV) method, and it was 60 mmHg in the study by Duh and Chiu [26] (Table 6).

Electronic cupping devices were used in 3 foreign studies. There were insufficient reports on the diameter of the cups in the literature.

Table 2. Summary Characteristics of Included Studies (Foreign).

First author (y)	Cupping device type	Cupping position	Cupping pressure (mmHg)	Cupping duration (min)
Tham [21] (2006)	Manual cupping device Plastic cups	Soft tissue Skin: 2 mm Fat: 10 mm Muscle: 10 mm	Constant negative pressure 100 mbar (75 mmHg) 300 mbar (225 mmHg) 500 mbar (375 mmHg)	
Blunt [22] (2010)	Cupping device Cups	Neck	Constant negative pressure: 100 kPa (750 mmHg)	
Huber [23] (2011)	Electronic cupping device Glass cups	Soft rubber pad	Maximum negative pressure LF1: 200 ± 30 hPa (150 ± 22.5 mmHg) LF2: 310 ± 30 hPa (232.5 ± 22.5 mmHg) AF: 560 ± 30 hPa (420 ± 22.5 mmHg) BA: 270 ± 16 hPa (202.5 ± 12 mmHg)	
Teut [24] (2012)	Electronic cupping device Silicone cups	Lower back, knee	Constant negative pressure: 100–200 mbar (75-150 mmHg)	Lower back: 5 Knee: 10
Emerich [25] (2014)	Electronic cupping device Glass cups	Lower back	Maximum negative pressure HV: 315 ± 64 hPa (236.3 ± 48 mmHg) NP: 283 ± 54 hPa (212.3 ± 40.5 mmHg) WC: 299 ± 59 hPa (224.3 ± 44.3 mmHg)	15
Duh [26] (2015)	Electronic cupping device Vacuum chamber	Forearm, palm	Maximum negative pressure: 60 mmHg	6
Teut [27] (2018)	Electronic cupping device Silicone cups	Lower back	Constant negative pressure: 150-350 mbar (112.5-262.5 mmHg)	8

Table 3. Constant Pressure Associated with Type, Diameter, and Volume of Cups (Domestic).

First author (y)	Cupping device type	Cup diameter (mm)	Cup Volume (cc)	Cupping pressure (mmHg)
Im [5] (1980)	Electronic cupping device Glass cups	50		Constant negative pressure: 60
Park [7] (1995)	Electronic cupping device Cups			Constant negative pressure: 60
Kweon [9] (2002)	Cupping device Cups	45	73	Constant negative pressure: 60
Lee [10] (2002)	Cupping device Plastic cups	25		Constant negative pressure: 60
Kim [15] (2010)	Negative pressure control device			Constant negative pressure: 225
Shin [6] (1988)	Cupping device Ceramic cups			Constant negative pressure: 240
Oh [8] (1999)	Cupping device Cups			Constant negative pressure: 400
Shin [4] (1979)	Cupping device Cups	30		Constant negative pressure: 600
Ryu [11] (2006)	Moxa cupping			Constant negative pressure: 600
Kim [16] (2010)	Surface meridian/acupoint energy measurement system			Constant negative pressure: 600
Kim [18] (2011)	Measurement system for changes in meridians			Constant negative pressure: 600
Kim [19] (2013)	Electronic cupping device Cups			Constant negative pressure: 600

Table 4. Maximum Pressure Associated with Type, Diameter and Volume of Cups (Domestic).

First author (y)	Cupping device type	Cup diameter (mm)	Cup volume (cc)	Cupping pressure (mmHg)
Sho [12] (2008)	Manual cupping device Plastic cups	Size 1: external diameter 50, internal diameter 48.8, height 71.2 Size 2: external diameter 44.5, internal diameter 43.7, height 68 Size 3: external diameter 39.7, internal diameter 39.1, height 68 Size 4: external diameter 32.7, internal diameter 32.3, height 68 Size 5: external diameter 30.3, internal diameter 25.5, height 66		Maximum negative pressure Size 1 (B: 397.28 / C: 362.36) Size 2 (A: 342.51 / B: 444.23) Size 3 (A: 365.56 / B: 466.50 / C: 423.10) Size 4 (A: 391.34 / B: 481.49 / C: 450.87) Size 5 (B: 510.28 / C: 464.83)
Kim [13] (2008)	Manual cupping device Plastic cups	A: internal diameter 44.7, height 50.8 B: internal diameter 35.7, height 47.9 C: internal diameter 28.3, height 47.9 D: internal diameter 21.3, height 47.9	A: 70.0 B: 36.9 C: 26.1 D: 13.8	Maximum negative pressure: 580-620
Yi [14] (2009)	Electronic cupping device Cups			Maximum negative pressure: 600 ± 10%
Yi [17] (2010)	Electronic cupping device Cups	Small: external diameter 35–37 Middle: external diameter 42–44 Large: external diameter 52–54		Maximum negative pressure Seo-ryong: 600 Noel: 600 Hansol: 550 G.O.P.O.: 570 Seoul Medical: 540
Kim [20] (2018)	Manual cupping device Cups Wet cupping	Size 1: external diameter 50, internal diameter 48.8, height 71.2 Size 2: external diameter 44.5, internal diameter 43.7, height 68 Size 3: external diameter 39.7, internal diameter 39.1, height 68 Size 4: external diameter 32.7, internal diameter 32.3, height 68 Size 5: external diameter 30.3, internal diameter 25.5, height 66		Maximum negative pressure Dongbang Size 1: 323.2 ± 9.8 DE Medical Size 1: 318 ± 7.0 Hansol Size 1: 381.8 ± 13.4 Daegun Size 1: 322.4 ± 9.8

Table 5. Constant Pressure Associated with Type, Diameter and Volume of Cups (Foreign).

First author (y)	Cupping device type	Cup diameter (mm)	Cup volume (cc)	Cupping pressure (mmHg)
Teut [24] (2012)	Electronic cupping device Silicone cups			Constant negative pressure: 75-150
Tham [21] (2006)	Manual cupping device Cups	50		Constant negative pressure: 75, 225 and 375
Teut [27] (2018)	Electronic cupping device Silicone cups			Constant negative pressure: 112.5-262.5
Blunt [22] (2010)	Cupping device Cups	40		Constant negative pressure: 750

Table 6. Maximum Pressure Associated with Type, Diameter and Volume of Cups (Foreign).

First author (y)	Cupping device type	Cup diameter (mm)	Cup volume (cc)	Cupping pressure (mmHg)
Huber [23] (2011)	Electronic cupping device Glass cups	50	168	Maximum negative pressure: LF1: 150 ± 22.5 LF2: 232.5 ± 22.5 AF: 420 ± 22.5 BA: 202.5 ± 12
Emerich [25] (2014)	Electronic cupping device Glass cups		168	Maximum negative pressure: HV: 236.3 ± 48 NP: 212.3 ± 40.5 WC: 224.3 ± 44.3
Duh [26] (2015)	Electronic cupping device Vacuum chamber			Maximum negative pressure: 60

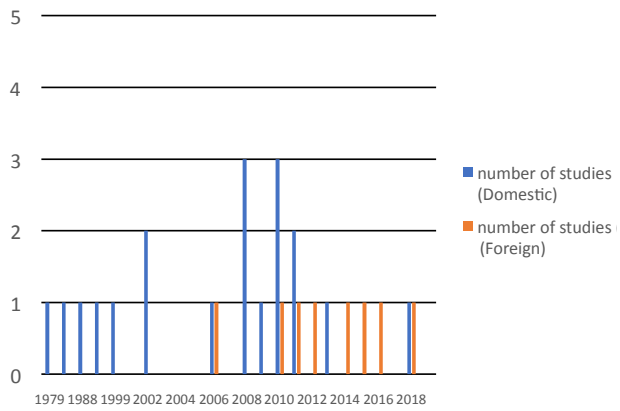

Fig. 3. The published year of studies.

Discussion

Cupping therapy was introduced to Korea, Japan and Southeast Asia a long time ago and it is still used today. Specially made glass cups, ceramic cups or bamboo cups are placed on the part of the human body being treated for disease [28]. Over time, various technologies to assist cupping have been developed. Recently, interest in cupping methods has resurfaced and a number of studies on cupping therapy have been undertaken [29,30]. Currently, the majority of Korean medicine doctors perform cupping for musculoskeletal problems and internal diseases. Despite this, there are no studies on post-treatment side effects such as blisters, with the exception of 1 study by Yun et al [31], and no standardised treatment procedure. In this study, a total of 27 studies related to cupping therapy were reviewed to establish the correlation between cupping pressure and treatment effects so that cupping therapy can be standardised.

It was observed that constant negative pressure used in domestic research varied widely, ranging from 60 mmHg to 600 mmHg. The diameter of the cups also varied widely, ranging between 25 mm and 50 mm, and the volume of cups was largely unreported. Therefore, further experimental studies are needed on the relative results using different diameters and volumes of cups with the same constant negative pressure.

In addition, the maximum negative pressure used in domestic research varied widely, ranging from 300–400 mmHg to 540–660 mmHg (using an electronic cupping device). Only 5 studies actually reported maximum negative pressure settings. Therefore, due to insufficient reporting, a conclusion could not be proposed.

Moreover, the reported constant negative pressure in 4 foreign studies also varied widely, ranging from 75 mmHg to 375 mmHg depending on the method of cupping used. The reported maximum constant negative pressure in the 4 foreign studies also ranged widely. Only 2 studies reported on the diameter of the cups, and this range was 40 mm to 50 mm. The number of studies was quite small and there was limited information about the volume of the cups, so conclusions could not be drawn.

Furthermore, the reported maximum negative pressure in the foreign studies varied widely (between 60 mmHg and 420 mmHg) although electronic cupping was used for all studies. Two studies reported the volume of the cup which was 168 cc. Unfortunately, the information provided on maximum negative pressure in the foreign studies was not sufficient to generalise the results.

Conclusion

In conclusion, although we investigated 27 studies, including domestic and foreign studies, there were large differences in the cupping devices used, the constant negative pressure, the maximum negative pressure, the cup size, and the cup volume. It was evident that there are no specific criteria for standardised cupping treatment, and we could not directly compare the results of these studies. Furthermore, many studies lacked detail on the methods used for cupping. Therefore, we could not make any conclusive recommendations about cupping therapy. In this context, further experimental studies are needed to establish standardised cupping therapy procedures.

Conflicts of Interest

The authors have no conflicts of interest to declare.

Acknowledgements

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