







## Commentary

# Misreport of burns as a result of 'coining', Gua sha; inherent harms from publication and ongoing citation of false facts



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## 1. Introduction

Articles published in the medical literature intend to forward knowledge and scholarship not only by issuing novel work but by contextualizing that work with accurate and rigorous reference to previous work. Unfortunately, reference inaccuracy is a prevalent and damaging problem on many levels; citation and quotation errors are common in medical literature.<sup>1–3</sup> They include misspelled words, incorrect or missing information or omission of references; content errors involving misquotation or misrepresentation of original work, or citing second-hand, invalid, outdated or unavailable resources. Spurious citations include over or redundant citation to give the impression of erudition. Biased citation can include or ignore specific resources, exclude contrary evidence or the work of rivals.<sup>1</sup> Inaccurate referencing can be '...misleading for the reader and initiate circulation of false facts'.<sup>1</sup> Citation inaccuracies can diminish research validity.<sup>3</sup>

Journal peer review is fundamental to publication accuracy of novel work including citations that provide context to that work. So what happens when an article's report of harms or adverse events is inaccurate? It is hoped that review by subsequent citing authors or even readers would catch the error. Surely, peer review of subsequent articles that cite the original error would note it. But this requires that journal peer reviewers seek out and read articles cited in a paper. While laborious, such an effort does not rely on

the accuracy or verity of previous peer review but instead joins the process with fresh eyes.

There are many cases of misreported harms related to the traditional East Asian healing technique 'coining' or cao gio (Vietnamese) which is taught as Gua sha (Chinese) in acupuncture colleges. This was due, in part, to language barriers, medical bias and cultural misgivings after the Vietnam war when many southeast Asians emigrated to the West.

The intentional transitory therapeutic petechiae and ecchymosis (see Box) from coining/cao gio/Gua sha has been misperceived as 'injury', 'dermabrasion', 'battery', 'abuse', 'pseudo-battery', 'pseudo-abuse', 'bruising', 'burns', 'dermatitis', 'factual dermatitis', 'pseudo-factual dermatitis', 'pseudo-bleeding', 'purpura', 'cutaneous stigmata' and 'hematoma'. Each is challenged elsewhere as mischaracterizations.<sup>4</sup> Here we focus specifically on the erroneous association of coining, cao gio, Gua sha with burns.

## Box quote

Gua sha (coining) is defined as instrument-assisted unidirectional press-stroking of a lubricated area of body surface to intentionally create transitory therapeutic petechiae and ecchymosis, called 'sha', representing extravasation of blood in the subcutis. This 'sha' ecchymosis fades in 3–4 days without residue or side-effect but with upregulation of heme oxygenase-1 (HO-1) which is anti-inflammatory and immune protective (Kwong 2009). Gua sha/coining is applied for pain as well as for fever, respiratory and acute infection conditions.

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**Fig. 1.** Amshel & Caruso burn case where a patient was painted with alcohol and mentholated oil and accidentally set afire. The round, nummular 'unburned' areas at the upper back were purportedly protected by coins from 'coining'.<sup>1</sup> (Used with permission).

## 2. The error: 'Coining', Cao gio, Gua sha does not cause burns

In 2000, Amshel and Caruso published a burn case reportedly related to Vietnamese 'coining', cao gio in the *Journal of Burn Care Rehabilitation*.<sup>5</sup> The patient was reportedly treated for back pain wherein they describe her back was painted with alcohol and oil and accidentally set on fire. The authors then describe 'coining' as application of hot mentholated oil to the body followed by vigorously coin rubbing on select areas. While 'instrument assisted unidirectional press-stroking' is not exactly rubbing (suggesting a back-and-forth motion), more ill-informed is that there is emphatically no flame involved in application of coining, cao gio, Gua sha. Nor is any oil typically preheated as this is not necessary. But if oil were pre-warmed it would be done so by setting a container in warm water. A patient would not sustain burns from warmed oil since it requires a person to apply the oil by hand. Yet subsequently Rampini et al. (2002) cite Amshel and Caruso as a report of coining burns from heated oil.<sup>6</sup> This is categorically wrong.

However, open flame is used in 'fire cupping'. And a quick look at Amshel and Caruso's article and images one immediately recognizes three round areas of the patient's upper back that were protected from burns...each approximately 3 inches across, where cups had clearly been placed. See Fig. 1. In fact the legend for their Fig. 1 the authors write: 'Note the unburned skin tissue on the patient's upper back where the coins had protected her from the fire.' Coins that are close to 3 inches across? While foreign cultures may appear idiosyncratic, none use coins that large!

### 2.1. Burns from negligent fire cupping

The Amshel & Caruso case is one of burns from negligent fire cupping that is a known risk.<sup>7-9</sup> In fire cupping, a cotton ball soaked in alcohol is set on fire, swirled inside of a cup and immediately applied to the body surface. The resulting vacuum in the cup creates suction that when placed on the body causes the surface tissue to tumeify into the cup. This is warming and also can raise transitory therapeutic petechiae and ecchymosis, discussed below. Application of oil across an area may be done for 'moving cupping' where cups are applied and then moved along an area. Alcohol is not applied across the body for cupping or for coining. Alcohol is extremely flammable and if applied to a person then exposed to flame would result in burns. This is the role of alcohol used in culinary flambéing where dishes are set on fire. The flame from burning alcohol on a person could, in turn, ignite massage oil if both were present. Mentholated massage oil alone would not likely catch fire in the absence of alcohol. The primary cautions relating to the flammability of massage oil are oil-soaked sheets catching fire in driers.<sup>10</sup> Amshel and Caruso's is a case of negligent fire cupping, and not a complication of coining.

To summarize:

- Alcohol is not used in coining.
- Fire is not used in coining.
- Both alcohol and fire are used in fire cupping.
- The 3-inch nummular areas on the patient's upper back were protected from burns due to the placement of cups, not coins. The patient clearly had cupping done.
- Coining is not typically done at the same time as cupping because the surface stretching of press-stroking would dislodge the cups in place.

### 2.2. Perpetuating the error: citing Amshel & Caruso

Clearly the person applying the cups in the Amshel & Caruso case did so negligently, causing burns to the patient. But Amshel and Caruso muddle this case as harms attributed to coining, a different technique altogether. Misreporting of harms is in itself a harmful medical error. And Amshel and Caruso's burn case continues to be cited as a known 'complication' of coining, furthering the myth in a kind of negligence.<sup>6,11-18</sup> Their single errant report of burns from coining becomes burns from heated oil,<sup>6,13</sup> that caught on fire,<sup>15</sup> that turns from a single case into a 'few reported cases' of burns, mostly minor,<sup>12,16,17</sup> with one (Amshel & Caruso) requiring skin grafting.<sup>5,12,15-17</sup> There are no other cases reported in the literature of burns associated with coining. Yet another publication (Darshi et al. 2020) cites four articles reporting burns (partial or full thickness) as adverse events associated with 'coining'.<sup>18</sup> They cite Amshel and Caruso, in an unexamined perpetuation of the myth. Two references are articles that cite Amshel & Caruso. But one of those actually refutes the association of burns with 'coining',<sup>4</sup> the other cites Amshel & Caruso as reporting cases of minor burns and one requiring grafting.<sup>17</sup> Finally the fourth burn reference by Darshi et al. describes allergic nickel dermatitis and does not mention coining or burns at all.<sup>19</sup> Darshi et al.<sup>18</sup> engage in redundant or spurious citations.<sup>1</sup> (See Table 1). Subsequent authors who do not examine the details of these references might cite four reports of burns associated with 'coining'. And so it goes in the continuation and magnification of the original error.

That original error could not continue to be perpetuated without the persistence of at least some of the original bias. And immigrant families have suffered this bias in the form of accusations of child abuse with some being prosecuted<sup>20</sup> due to

**Table 1**

Amshel &amp; Caruso's article misattributing burns to coining; their references, and subsequent citations, Journals and their implications.

Citing Authors/year	Language citing Amshel and Caruso burns from coining.	Implications	Journal
Rampini et al. 2002	Pg. 45 'Known complications of this procedure are burns after application heated oil and cerebral hemorrhage'.	Erroneously cite Amshel & Caruso for burns from heated oil, authors also refer to but fail to cite Ponder's article where association with brain bleed is unproven. Camphor poisoning was from the product and not from coining.	<i>JAMA</i>
D'Allesandro & D'Allesandro 2005	Differential diagnoses of child abuse includes...bruising and burns from cupping or coin rubbing.	Authors do not promote or refute cupping or coining as abuse.	<a href="https://pediatriceducation.org/2005/06/06/what-are-some-of-the-presentations-for-child-abuse-and-neglect/">https://pediatriceducation.org/2005/06/06/what-are-some-of-the-presentations-for-child-abuse-and-neglect/</a>
Swerdlin et al. 2007	Pg 381. There have been a few reported cases of serious complications from coining that required skin grafts when the oil on the skin caught fire.	Swerdlin et al. embellish Amshel and Caruso now as 'a few reported cases'...then writing 'most of the complications have been minor burns.' Without any citation or support.	<i>J Am Acad Dermatol.</i>
Nielsen 2009	Pg 66: A burn case reportedly caused by coining, cao gio (Gua sha) was in fact related to fire cupping (Amshel and Caruso, 2000). And yet burns continue to be erroneously cited as a risk of (coining).	Burns identified as negligent cupping.	<i>J Bodyw Mov Ther</i>
Ravanfar & Dinulos 2010	Pg 424: The use of these heated lubricants has been associated with burns (Amshel)	Authors use descriptions from sources they fail to cite.	<i>Curr Opin Pediatr</i>
Tan et al. 2011	Pg 98: 'Coining is perceived to be safe despite reports of serious complication associated with the technique.'	Tan et al. call for change in perception of traditional forms of treatment.	<i>Malaysian Fam Phys</i>
Lilly & Kundu 2012	Pg. 373 There has only been one case of a more severe adverse effect when the oiled skin on which coining is performed caught fire.	Pg 372 Authors also erroneously state cupping causes circular burns as a matter of course. Pg 373 Authors mis-state fire risk of oiled skin.	<i>Int J Dermatol.</i>
George et al. 2016	Pg 145: 'Minor superficial burns are a commonly reported adverse effect of coining. There have been scattered case reports of more serious complications...include full thickness skin burns necessitating skin grafting (Amshel), cerebellar hemorrhage thought to be mediated by the pain-activated sympathetic response to coining (Ponder) and altered mental status as a result of the systemic absorption of camphor (an ingredient commonly found in balms and oils)' (Rampini)	Authors state: The true incidence of these more serious implications is unknown and likely underreported. Authors erroneously cite Amshel & Caruso for burns from heated oil; authors cite Ponder's article where association with brain bleed is unproven. Camphor poisoning was from the product and not from coining.	<i>Skinmed</i>
Vashi et al. 2018	Pg 11: among complications cited are minor burns and one burn requiring grafting (Amshel).	Cite Swerdin et al. re multiple cases of minor burns not supported in either paper.	<i>J Am Acad Dermatol.</i>
Darsha & Cohen 2020	Pg 6 of 7: Authors cite 4 articles reporting 'burns' of partial or full thickness. Nielsen et al. 2007 which refutes the association of burns with coining. Vashi et al. 2018 which cites Amshel and Swerdin et al. 2007. Amshel & Caruso (original case). Thyssen et al. 2013 which does not mention coining or burns at all.	Authors expand on the single case by Amshel & Caruso by citing 3 other articles. One refutes association of burns with coining, one cites Amshel & Caruso and the third does not mention burns or coining at all. This is redundant and spurious citations.	<i>Cureus</i>

the misperceptions by Western doctors of the 'risks' of traditional East Asian 'coining', cao gio, Gua sha.

### 3. Clarity: research into the therapeutic benefit of Gua sha, Cao gio, 'coining'

Research demonstrating an anti-inflammatory and immune protective effect of Gua sha, 'coining', cao gio via the ferroheme metabolism<sup>21,22</sup> vindicates its use as a traditional East Asian therapy with studied clinical applications in neck and back pain,<sup>23-25</sup> peripheral neuropathy,<sup>26</sup> breast engorgement/mastitis,<sup>27</sup> hepatitis/liver inflammation<sup>28,29</sup> with potential for fevers and other acute inflammatory conditions.<sup>30,31</sup>

The upregulation of heme-oxygenase-1 (HO-1) is a known therapeutic target in medicine<sup>32</sup> as cytoprotective in organ inflamma-

tion,<sup>22,33</sup> including of the liver,<sup>34</sup> kidneys,<sup>35</sup> lungs,<sup>36</sup> heart and cardiovascular system,<sup>37,38</sup> gastrointestinal system,<sup>39</sup> in ischemia and reperfusion,<sup>40</sup> in organ transplant protection,<sup>41</sup> organ failure,<sup>42</sup> autoimmunity,<sup>43</sup> obesity<sup>44</sup> and metabolic disorders<sup>45,46</sup> and as an anti-viral agent.<sup>47,48</sup>

As an established inducer of HO-1 upregulation, the traditional East Asian technique of 'coining', Gua sha, cao gio, as well as those who have used it and passed it on through generations, deserve a certain respect as research has evolved to recognize its therapeutic value. To that end as well, each of the journals that published the citing articles after apparent lax peer review are presently requested to now attach an errata and correction of burns as a complication or risk. Burns are not a risk, complication or adverse event associated with 'coining', cao gio or Gua sha. It is time to correct this error.

## CRediT authorship contribution statement

**Arya Nielsen:** Writing – original draft. **Marsha Handel:** Writing – review & editing. **Jennifer A. M. Stone:** Writing – review & editing. **Myeong Soo Lee:** Writing – review & editing.

## Conflicts of interest

AN and MSL are on the journal's editorial board and this commentary was invited. The authors report no other conflicts of interest.

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