

The Science of Gua sha *

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Traditional East Asian medicine (TEAM) has come some distance to us: more than 2,000 years of history, a scholarly archive and many 'barefoot miles' to now be situated in professional clinics and labs of research globally. Gua sha is a modality used across Asia both in the clinic and in the home and now in the West. Gua sha is a part of 'acupuncture therapy' but not limited by law to acupuncture practice. Research into the physiology of therapies like acupuncture and Gua sha qualifies what the ancients 'knew'. With respect for those who have given us this gift, science works to clarify both benefit and risk of our medicine.

When I began practice 37 years ago, I was trained in East Asian medicine but had no training in research and there was zero access to research facilities through acupuncture schools. Many years later I consulted Helen Langevin, MD about my interest in researching the biomechanism of Gua sha. She advised starting with basic science: what can be used to establish a measure of change that might inform what is actually observed? I mulled this and looked for a doctoral program that would support my research interest. I matriculate to an academic PhD program and through a chance meeting at my job at Beth Israel Medical Center in New York was invited by Dr. Gustav Dobos to conduct research on Gua sha at the University of Duisburg-Essen in Essen, Germany. There we performed one of the first investigations on the physiology of Gua sha: measuring changes in microperfusion of surface tissue.¹ From that first investigation have come other biomarker studies; we now have something to say about the science of Gua sha.

Gua sha increases surface microperfusion

Gua sha produces transitory therapeutic petechiae that represent extravasation of blood in the subcutis. Using laser Doppler imaging, we scanned 11 'healthy' (but stressed) subjects (doctors and nurses who worked at the Kliniken Essen) who had 'normal' myalgia pain and evidence of 'sha' based on palpation. We established a baseline scan for each subject before Gua sha and then scanned each subject 10 times, once every 2.5 minutes following Gua sha, and then a follow up scan 2 days later.

We found a 400% increase in microperfusion (surface circulation of blood) for 7.5 minutes following Gua sha, and a significant increase for the full 25 minutes following treatment that was studied. Scans returned to baseline at the 2-day point. Every subject experienced a decrease or complete resolution in pain and a sense of well being. We published the study¹ and it was the basis for my doctoral dissertation.²

During this same period, access to the Chinese language database became available to me online through the Kelley Library at the New England School of Acupuncture (NESA). I downloaded and translated 120 articles on Gua sha. By 2011, that number

increased to over 500 studies. These articles establish how Gua sha is used in China and are analyzed in my revision of the Gua sha book due out this year.³

Then in 2009 a breakthrough study on the physiology of the anti-inflammatory and immune effect of Gua sha was published here in West.

Gua sha's immune and anti-inflammatory effect: heme oxygenase-1

Providers familiar with Gua sha know that it can reduce a fever and alter the course of an acute infectious illness as well as reduce inflammatory symptoms in chronic illness. A group at Harvard used bioluminescent imaging with a mouse showed that Gua sha upregulates gene expression for an enzyme that is an anti-oxidant and cytoprotectant, heme oxygenase-1 (HO-1), at *multiple internal organ sites immediately after treatment and over a period of days following Gua sha treatment.*⁴

HO-1 and its catalysates (biliverdin, bilirubin and carbon monoxide (CO)) exhibit not only anti-oxidative but also anti-inflammatory effects.⁵ For example, augmentation of HO-1 expression attenuates allergic inflammation. HO-1 plays a protective role in allergic disease in part by inhibiting Th2 cell-specific chemokines. The work by Kwong's group⁴ is the first to show an immediate and sustained immune response from a traditional East Asian modality that has direct relevance in the healing of 'internal organ' and inflammatory problems.

It is also known that HO-1 regulates cell cycle and anti-smooth muscle hyperplasia, providing protection in many disease models, such as asthma, organ transplant rejection, inflammatory bowel disease and experimental autoimmune encephalomyelitis, even though the immune pathological mechanisms of these diseases are dissimilar.⁵

And then there is hepatitis. Gua sha is used in China to treat symptoms of acute and chronic hepatitis.³ Induction of HO-1 results in decreased hepatitis C virus (HCV) replication, as well as protection from oxidative damage, suggesting a potential role for HO-1 in antiviral therapy and therapeutic protection against hepatocellular injury in HCV infection.⁶ Moreover, the role of Gua sha in the treatment of active chronic hepatitis B has begun to be elucidated. Here too the upregulation of the enzyme HO-1 has been reported to be effective in the control of hepatitis B virus (HBV) infection and offers hepatoprotection in animal models.⁷

Gua sha in the treatment of chronic active hepatitis B

Manual therapies like Gua sha may be useful for many conditions but may become essential clinical options particularly for what are called 'gaps in care', i.e. when patients cannot or prefer not to take medicines for a problem, or when those medicines fail or are not available. It is well known that chronic hepatitis is a difficult condition because of the inflammatory breakdown of the liver over time that can cause illness and even premature death. Medications for the treatment of hepatitis are limited in scope and carry uncomfortable or intolerable side-effects.

In 2011 a team at Harvard/Mass General describes a case where a single Gua sha treatment in a patient with active chronic hepatitis B reduced levels of liver enzymes alanine transaminase (ALT) and aspartate transaminase (AST), modulated T-helper Th1/Th2 balance and enhanced HO-1, which they suggest is responsible for the hepatoprotective effect.⁸ In this case, and in general, Gua sha may be effective in transiently reducing the inflammatory injury to the liver when chronic hepatitis B moves into the immune active phase indicated by liver function test. While Chan et al. represents one case, it coincides with both evidence from China of Gua sha used for hepatitis with what is already known about the effect of upregulation of HO-1, and that HO-1 is upregulated from Gua sha.

Larger trials are needed to establish to what degree and at what dosage/frequency Gua sha may be hepatoprotective in patients with active hepatitis. Is it the case that treatment every week or every other week, with other liver sparing dietary cautions, will reduce inflammatory injury to the liver and return a patient to 'inactive' status? If the research bears out, Gua sha will have an essential role in managing chronic active hepatitis. One could say if it were a drug, establishing this effect would be considered a medical breakthrough.

Evidence-based research: other conditions responsive to Gua sha

Historically, Gua sha is indicated for any problem that has a feature of surface or internal blood stasis and/or pain, which means in classical Chinese practice in the tradition of Dr. James Tin Yau So, every patient is checked for sha. The articles and studies from the Chinese language database cover an array of conditions responsive to Gua sha including headache, migraine, neck, shoulder, back, and knee pain, as well as acute diseases such as fever, flu, earaches, asthma and bronchitis in children and adults. Gua sha is also effective in chronic disease including hepatitis, as discussed above. The bulk of the Chinese articles are large case series as well as randomized controlled trials.³ However, studies done in China are still subject to skepticism by some unless repeated in the West.⁹

And now there is evidence in Western peer reviewed journals. There are case reports in of Gua sha for migraine,¹⁰ post herpetic neuralgia,¹¹ and breast distension/mastitis¹² as well as randomized controlled trials reporting Gua sha has benefit in treating neck pain,¹³ neck and back pain¹⁴ and breast distension/mastitis.¹⁵

Summary

In the last decade, research has begun to clarify how Gua sha works. Gua sha's therapeutic petechiae represent blood cells that have extravasated in the capillary bed and measure as a significant increase in surface microperfusion. As this blood is reabsorbed, the breakdown of hemoglobin upregulates HO-1, CO, biliverdin and bilirubin, which are anti-inflammatory and cytoprotective. Studies show the anti-inflammatory effect of Gua sha has a therapeutic impact in inflammatory conditions, such as active chronic hepatitis, where liver inflammation indicates organ breakdown that over time can lead to premature death. The physiology of HO-1 may also explain Gua sha's anti-inflammatory effect in

other responsive clinical conditions, such as fever, cough, asthma, bronchitis, emphysema, mastitis, gastritis, musculoskeletal and other painful conditions presenting as neck pain, back pain, migraine, postherpetic neuralgia and others. Gua sha's anti-inflammatory and immune protective properties are important for practitioners to understand and be able to communicate to their patients as well as to other health care practitioners. **

Dr. Arya Nielsen is an American acupuncturist taught in the classical lineage of Dr. James Tin Yau So and in practice for over 35 years. She graduated in the first class of the first acupuncture college in the United States in 1977. She is a practitioner, a teacher, an author, and researcher and is considered the Western authority on Gua sha. Dr Nielsen has a faculty appointment at a New York teaching hospital, Beth Israel Medical Center, where she directs the Acupuncture Fellowship for Inpatient Care.

**New safety protocols for Gua sha and Baguan have been proposed by Dr. Nielsen and her medical team at Beth Israel Medical Center in New York.¹⁶

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