“For major medical issues, I have health insurance. For everything else, I have Bentonite Clay.”

-Jan Eversole-

The Healing Power of Bentonite Clay

Presented by Neal Bosshardt
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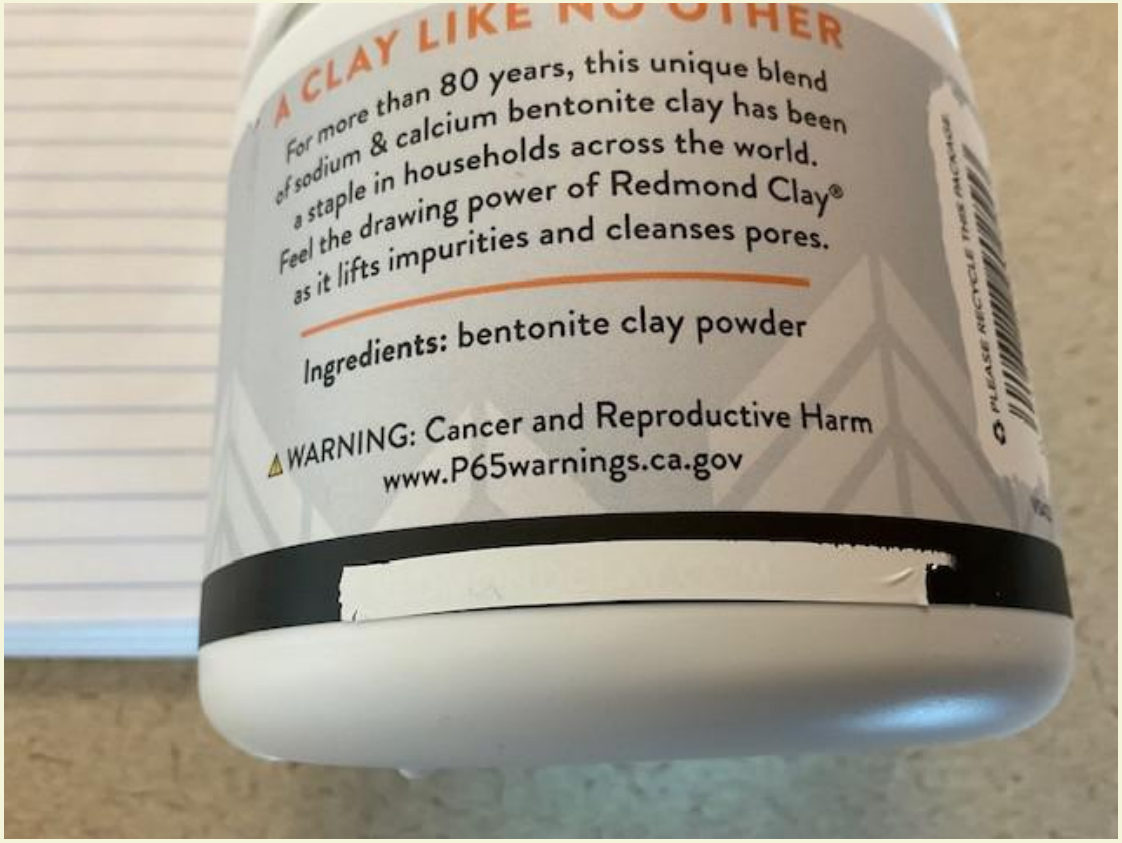
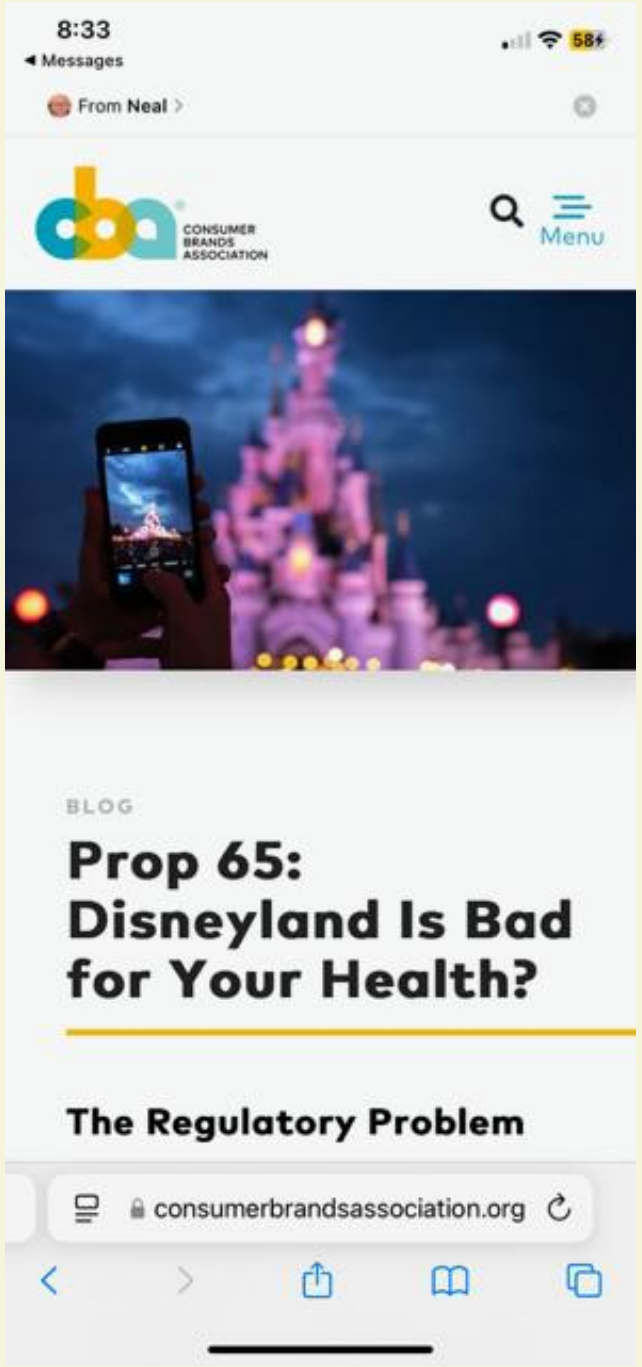
Prop 65 Warning





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Abstract

This work examines the beneficial effects for human health of clay minerals, describing their use in pharmaceutical formulations, spas and aesthetic medicine. Their therapeutic action as active principles in pharmaceutical formulations orally administered (gastrointestinal protectors, laxatives, antidiarrheics) or for topical applications (dermatological protectors and cosmetics) is described. Their use as excipients and their influence in the bioavailability of the organic active principle is also described, both in the liberation process and in its possible degradation effect. Among their uses in spas, clay minerals therapeutic activity, in geotherapy, peloidtherapy and pamuuds is commented upon. Moreover, the applications of the clay minerals in aesthetic medicine (to clean and moisturise the skin and to combat compact lipodystrophies, acne and cellulite) are also described. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: Clay minerals; Pharmaceutical formulations; Spas; Aesthetic medicine

1. Introduction

The use of minerals for medicinal purposes is almost as old as mankind itself. Minerals have been used for curative ends since Prehistory. There are indications that *Homo Erectus* and *H. Neanderthalensis* used ochres mixed with water and different types of muds in order to cure wounds, soothe irritations, as a method of cleansing the skin, etc. This might have been due to their mimicking animals, many of which instinctively use minerals for the above purposes. The use of medicinal earths in Mesopotamia and Ancient Egypt has also been proven. The use of Nubian earth as an anti-inflammatory or the use of mud materials for mummification of cadavers can be cited as examples (Bech, 1987; Robertson, 1996; Veniale, 1997). In the Ancient Greek period, mud materials (Lemnos Earth) were used as antiseptic cataplasms to cure skin affections, as cicatrisers or as a cure for snake bites. Both Hippocrates and Aristotle, among others, produced classifications of medicinal earths. Most of these materials are clays, given different names depending on their origins or on the differences in their mineralogical composition and properties. For example, *Terra Samia*, *T. Sigillata*, *T. Lemnia*, *T. Cimolia*, *T. Sinopica*, *T. Eretria*, *T. Negra*, etc. (Bech, 1996; Giammatteo et al., 1997). Furthermore, Cleopatra, Queen of Egypt, used muds from the Dead Sea for cosmetic purposes and Marco Polo describes how in his travels he saw Muslim pilgrims cure fevers by the ingestion of "pink earth" (Veniale, 1996).

The first written reference known to exist upon the use of "stones" and a description of their curative

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Unearthing the Antibacterial Mechanism of Medicinal Clay: A Geochemical Approach to Combating Antibiotic Resistance

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Natural antibacterial clays, when hydrated and applied topically, kill human pathogens including antibiotic resistant strains proliferating worldwide. Only certain clays are bactericidal; those containing soluble reduced metals and expandable clay minerals that absorb cations, providing a capacity for extended metal release and production of toxic hydroxyl radicals. Here we show the critical antibacterial components are soluble Fe^{2+} and Al^{3+} that synergistically attack multiple cellular systems in pathogens normally growth-limited by Fe supply. This geochemical process is more effective than metal solutions alone and provides an alternative antibacterial strategy to traditional antibiotics. Advanced bioimaging methods and genetic show that Al^{3+} misfolds cell membrane proteins, while Fe^{2+} evokes membrane oxidation and enters the cytoplasm inflicting hydroxyl radical attack on intracellular proteins and DNA. The lethal reaction precipitates Fe^{3+}-oxides as biomolecular damage proceeds. Discovery of this bactericidal mechanism demonstrated by natural clays should guide designs of new mineral-based antibacterial agents.

The emergence of antibiotic resistant human pathogens has accelerated inquiries into alternative antibacterial compounds[1–4]. Bacteria rapidly establish resistance against traditional antibiotics that target specific cellular mechanisms DNA replication, protein and cell wall synthesis[5]. As a result, alternative mineral-based therapies against bacterial infections have gained attention[6–8]. Clays, although used for medicinal purposes throughout millennia, have remained largely unstudied for their applications and reported medical benefits[9–11]. Documented use of reduced metal-rich clays in healing necrotizing fasciitis[9], commonly known as 'flesh eating bacteria', led to our research on the geochemical properties of antibacterial minerals. When tested against a broad spectrum of human pathogens, it was shown that certain clays also kill antibiotic resistant pathogens including methicillin-resistant *Staphylococcus aureus* (MRSA)[9].

The term 'clay' refers to $<2\,\mu m$ minerals of any type, and this size fraction commonly contains discrete clay minerals (smectite, illite, kaolinite), which provide an enormous surface area ($100's\ m^2/g$) for cation exchange reactions when hydrated[9]. Only a few clays have been identified as antibacterial, completely killing a broad spectrum of human pathogens[9,10,12]. Initially we compared the geochemical properties of several antibacterial clays to identify similarities among their mineral assemblages[9,10]. Notably the pH of the hydrated antibacterial clays was either high (>10) or low (<5) where Al and Fe are soluble. This directed our investigation to evaluating the toxicity of soluble elements on pathogenic bacteria.

Antibacterial susceptibility testing of numerous clay deposits led to discovery of a deposit from the Oregon Cascades that is 100% effective at killing all pathogens we have tested so far, including antibiotic resistant strains (see Methods). The antibacterial zones in this deposit formed in hydrothermally altered andesite porphyry associated with argillic clay alteration and volcanogenic massive sulfides[10]. The antibacterial Blue clay zones from this deposit contain mixed layered illite-smectite, pyrite, Ca-plagioclase and quartz. Reconnaissance studies[9,10] showed that this clay kills pathogens by chemical toxicity that occurs in <24 hrs, rather than physical disruption of cells. In nature microbes have evolved in contact with clays, many deriving energy from the minerals[13–15].

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Trauma, Burns & Clay

Acetylene Torch Burn

Before

After

Ten Minutes: “At least it doesn’t hurt anymore.”

Four Days: “It’s just pink skin.”

Treadmill Injury – 10 Year Old Boy

1st Day

"The only discomfort was when we changed the clay once a day."

After 1 Week

"The new skin can be touched without pain."

After 3 months

"Thanks so much!"

Brown Recluse Spider Bite

2 days after bite before first Dr. Visit – 3/28

6 days after bite

8 days after bite

11 days after bite –

Day Before Starting Clay

13 days after bite

1st Day after Clay

15 days after bite

3 days of clay

18 days after bite - 6 Days of Clay

22 days after bite – 10 days of clay

Day Before Starting

25 days after bite 13 Days of

4 Months After the Bite

Road Rash from Bike Accident

Before

Road Bike Race Accident. 25+ mph, Rocks, Dirt, etc. Race Dr. said it would have to be professionally cleaned by a Dr. to avoid it becoming a permanent “tattoo” from the deeply embedded road debris.

During

The pain decreased almost immediately after the wet clay was applied. (The clay looks a little lumpy because it wasn’t previously mixed into a gel so it didn’t have a chance to fully hydrate before it was applied.)

2 hours later

Notice how clean the wound is after the clay was able to lift and remove the rocks, dirt, etc. without needing to have a Dr. painfully “clean” the wound. Clay was applied two more times after this picture and it completely healed.

Broken Ankle with Infected Pins

4 months of wound clinic

1 Week of Clay

3 Weeks of Clay

“Thanks to the clay, I still have a foot.”

8 Year old Boy Ran Over Hand with Go-Kart

Day 1

Day 1

Day 2

Day 4

Day 9

Day 13

WARNING

This gallery contains graphic images that some viewers may find disturbing

Thigh Ripped Open with Farm Implement

Day 3 – March 15, 2016

Day
10

Day
17

Day
31

Day
45

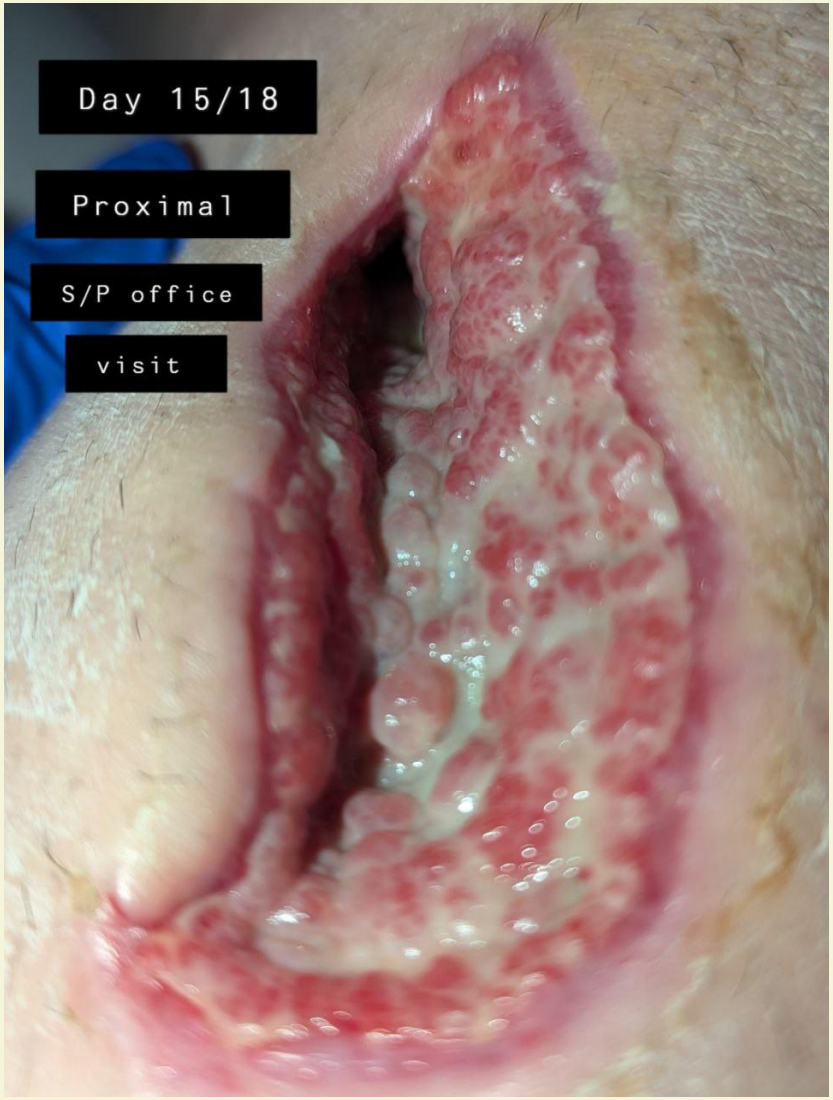
Day 63 – May 17, 2016

One Year Later

Tiller Tine Injury

Entry Hole

Day 15

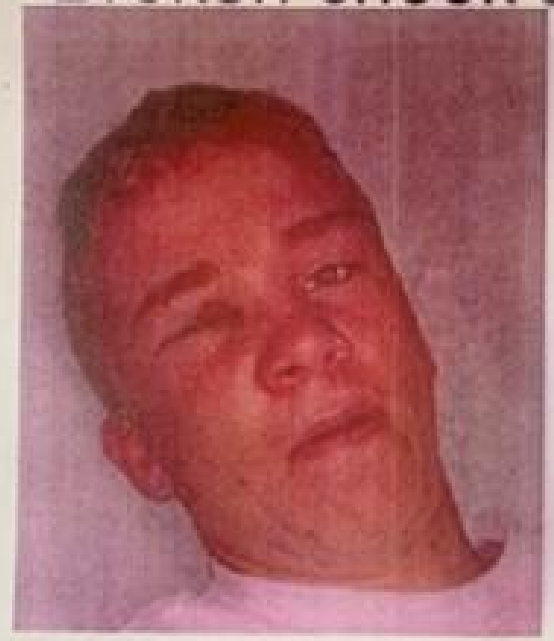


Day 23

Gauze with Clay

3 Months

Broken cheek and nose bones



Before clay

A couple hours after a clay pack

A 15 year old male was hit in the face at close range by a hard thrown baseball. He turned his head just before impact, so it hit a glancing blow on the cheek and nose, but the impact lifted him off his feet. At the hospital, the doctor said the X-rays showed the cheek bone was shattered and the nose was broken so badly the victim would have to have an ENT rebuild his nose. An appointment was made for a week later when the swelling should be down. The parents packed his entire face in wet clay gel that night including filling the one eye socket with clay. With the clay on his face, his pain was so minor he never took anything but a Tylenol.

They kept wet clay on the face from Thursday night until Saturday morning. There never was any swelling and his eyes didn't show any signs of bruising. The following Wednesday when the doctor was 're-building' his nose, he made the comment that the young man should have had two black eyes from such an injury.

Cancerous Tumor Removed from Head

Day 1

Day 3

1 Week

1 Month

2 Months

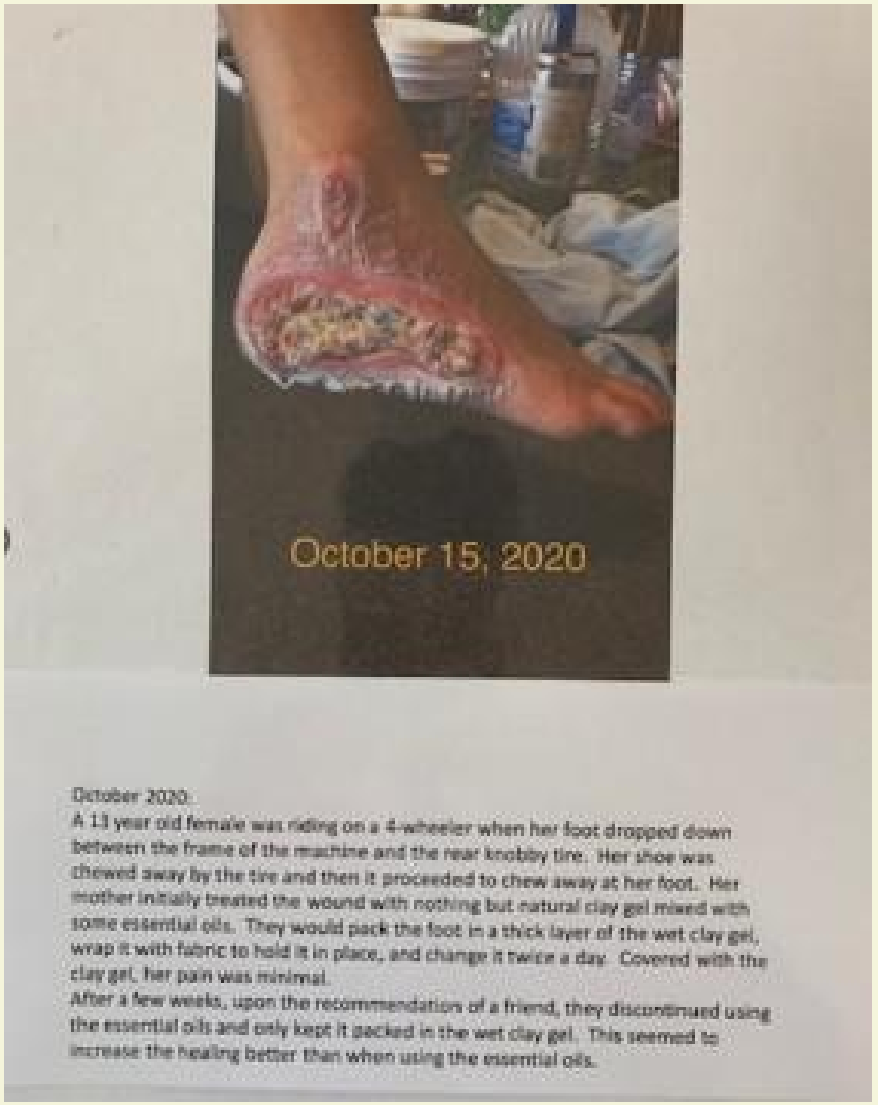
3 Months

4 Months

Shingles – Pain Level 5

Duration – 1 Week

4-Wheeler ATV Accident



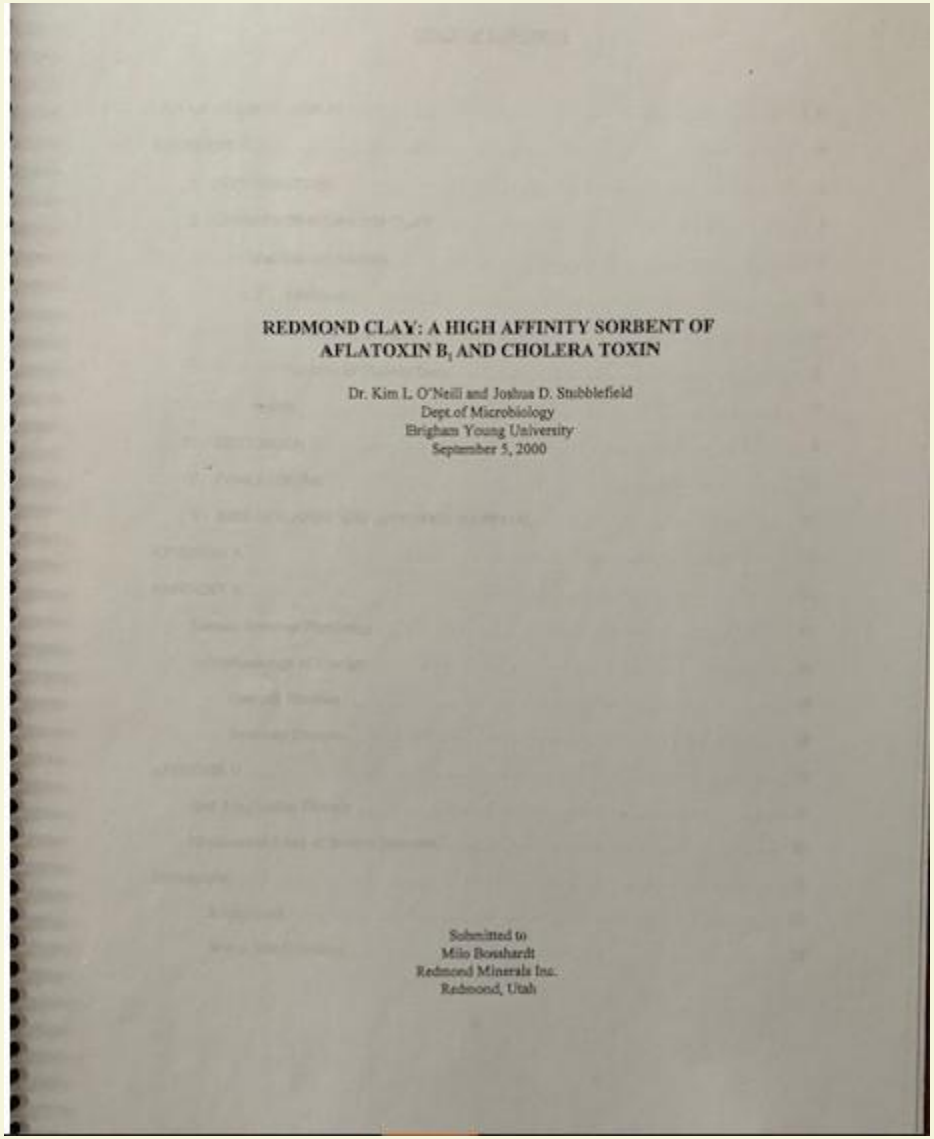
A few months later.
They are still pleased with the way it healed. The mother says if it bothered her daughter more, she would use coconut oil or vitamin E on it to soften the scar.

Gasoline Burns – 1 Week in Burn Center

Carpal Tunnel Surgery

T-Post Horse Injury

Major University Study



REDMOND CLAY: A HIGH AFFINITY SORBENT OF AFLATOXIN B_1 AND CHOLERA TOXIN

Dr. Kim L. O'Neill and Joshua D. Stubblefield
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September 5, 2000

Submitted to
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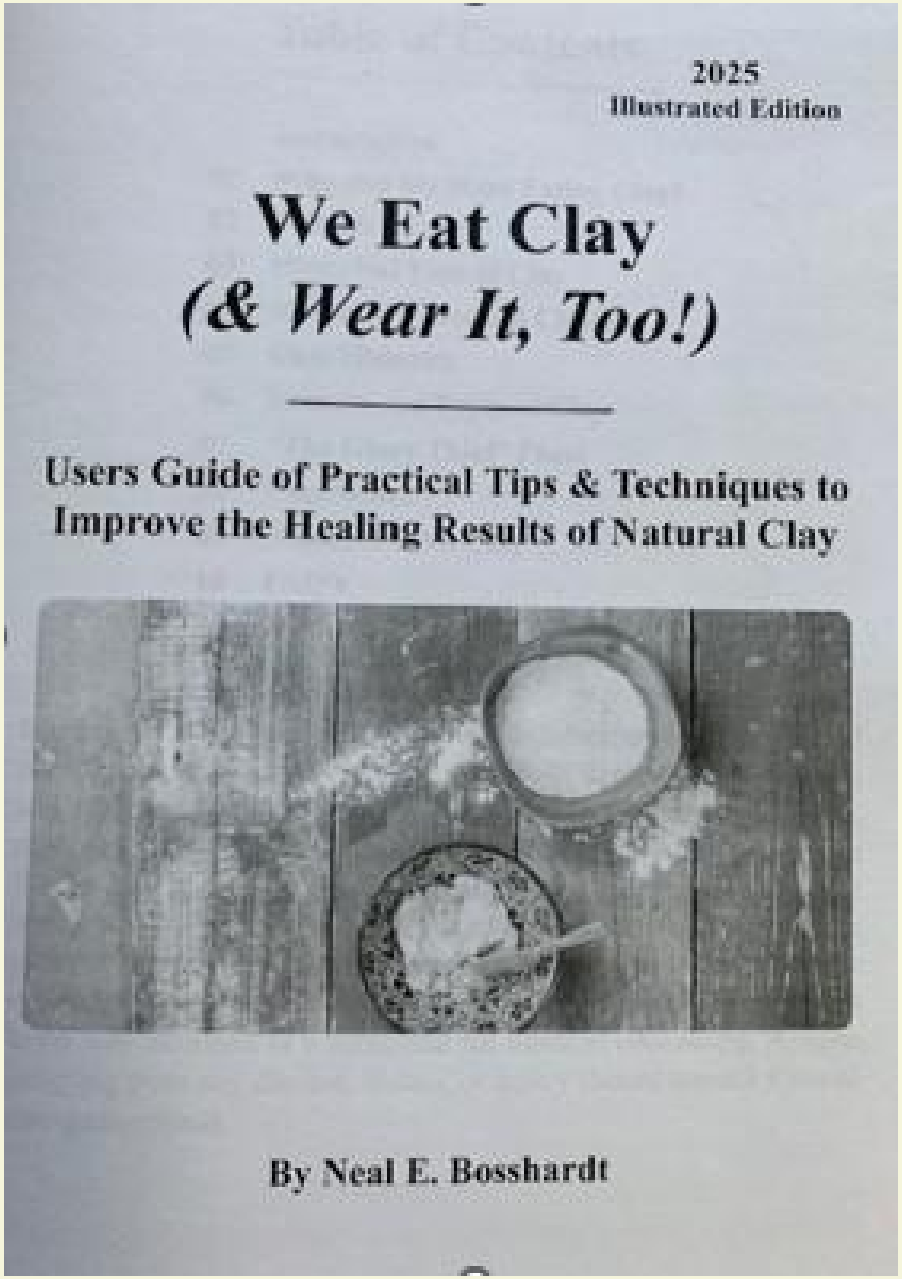
Redmond, Utah



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