Pain Management using Essential Oils and Aromatherapy Validated by Digital Infrared Thermal Imaging Technology

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Abstract

Past years have seen the study of essential oils and aromatherapy using historical anecdotal evidence and the known chemical breakdown of its individual components. Information on the action of essential oils and aromatherapy at present relies on trials and pilot studies, anecdotal evidence and single case studies. There also seems to be very little clinical evidence available on the analgesic effects of essential oils on conditions such as muscular pain, rheumatism, arthritis and inflammatory bowel disease. This is because it is not possible to do a "double-blind" test on an aromatic substance as the presence or absence of an aroma is immediately obvious to the participants. Like any clinical trial, including pharmaceutical, approximately 30% of the results can be put down to "the placebo effect". However, we can now accurately validate the effects of essential oils and aromatherapy on various pain conditions using thermal imaging technology. This is breakthrough research in validating aromatherapy as an effective pain management system and an alternative to the existing allopathic treatment which can often produce debilitating side-effects, especially when muscle bruising and joint sprains are the most common injuries worldwide.

What is Digital Thermal Imaging Technology – How can it be used to accurately show the benefits of using essential oils and aromatherapy? How will this affect the perception of people using aromatherapy for health & wellbeing?

This paper will discuss the basic concepts of using Digital Thermal Imaging Technology as a tool to show the analgesic and anti-inflammatory effects of essential oils and aromatherapy.

What are the current "pharmaceutical" products/systems for pain management?

Pain management (also called pain medicine) is the discipline concerned with the relief of pain.

Acute pain, such as occurs with trauma, often has a reversible cause and may require only transient measures and correction of the underlying problem. In contrast, **Chronic pain** often results from conditions that are difficult to diagnose and treat, and that may take a long time to reverse. Some examples include cancer, neuropathy and referred pain. Often, pain pathways are set up that continue to transmit the sensation of pain even though the underlying condition or injury that originally caused pain has been healed. In such situations, the pain itself is frequently managed separately from the underlying condition of which it is a symptom, or the goal of treatment is to manage the pain with no treatment of any underlying condition (e.g. if the underlying condition has resolved or if no identifiable source of the pain can be found).

Pain management generally benefits from a multidisciplinary approach that includes pharmacologic measures (analgesics such as narcotics or NSAIDs and **pain modifiers** such as tricyclic antidepressants or anticonvulsants), non-pharmacologic measures (such as interventional procedures, physical therapy and physical exercise, application of ice and/or heat), and psychological measures (such as biofeedback and cognitive therapy).

Pain management practitioners come from all fields of medicine. Most often, pain fellowship trained physicians are anesthesiologists, neurologists, physiatrists or psychiatrists. Some practitioners focus more on the pharmacologic management of the patient, while others are very proficient at the interventional management of pain. Interventional procedures - typically used for chronic back pain - include: epidural steroid injections, facet joint injections, neurolytic blocks, Spinal Chord Stimulators and intrathecal drug delivery system implants, etc. Over the last several years the number of interventional procedures done for pain has grown to a very large number.

As well as medical practitioners, the area of pain management may often benefit from the input of Physiotherapists, Chiropractors, Clinical Psychologists and Occupational Therapists, amongst others. Together the multidisciplinary team can help create a package of care suitable to the patient. One of the pain management modalities are trigger point injections and nerve blocks utilizing long acting anesthetics and small doses of steroids.

Analgesia

An **analgesic** (colloquially known as a **painkiller**) is any member of the diverse group of drugs used to alleviate pain (achieve ***analgesia***). The word *analgesic* derives from Greek *an-* ("without") and *-algia* ("pain").

Analgesic drugs act in various ways on the peripheral and central nervous systems.

The major classes

They include

1. paracetamol (acetaminophen),
2. the non-steroidal anti-inflammatory drugs (NSAIDs) such as the salicylates,
3. narcotic drugs such as morphine,
4. synthetic drugs with narcotic properties such as tramadol,
5. and various others.

Paracetamol

Paracetamol is a p-aminophenol derivative that exhibits analgesic and antipyretic activity. It does not possess anti-inflammatory activity.

Paracetamol is thought to produce analgesia through a central inhibition of prostaglandin synthesis.

Paracetamol is metabolised extensively in the liver and excreted in the urine mainly as inactive glucuronide and sulfate conjugates. Less than 5% is excreted unchanged. The metabolites of paracetamol include a minor hydroxylated intermediate which has hepatotoxic activity. This intermediate metabolite is detoxified by conjugation with glutathione, however, it can accumulate following paracetamol overdosage (more than 150mg/kg or 10g total paracetamol ingested) and if left untreated can cause irreversible liver damage, often heightened with use of alcohol. The number of accidental self-poisonings and suicides has grown in recent years.

Aspirin

Aspirin (acetylsalicylic acid) is an anti-inflammatory pain killer (NSAID), which is extensively used, worldwide, for pain relief, to reduce inflammation and temperatures, and to reduce the risk of heart attacks and strokes.

Aspirin works to reduce inflammation and pain, by inhibiting cyclooxygenase, leading to a decrease in prostaglandin production; this reduces pain and also inflammation (in contrast to paracetamol and the opioids).

The most common unwanted affect is indigestion, and so it should not be used (except on medical advice) in someone who has a peptic ulcer or has had one in the past.

Also as a result of this side effect, it should be used with caution, if at all, in somebody prone to heartburn or indigestion. It is best to take aspirin after food.

Skin rashes occur in some people, and sometimes with dramatic swelling of the face and mouth and difficulty breathing (anaphyllactic reaction).

A very rare, but serious condition in children (Reye's Syndrome) is believed to be more likely to happen in children who have taken aspirin for mild viral symptoms. As a result, aspirin is no longer used routinely in children below the age of 16 years or for breast feeding mothers.

NSAIDs

NSAIDs (like Aspirin) inhibit cyclooxygenase, leading to a decrease in prostaglandin production; this reduces pain and also inflammation (in contrast to paracetamol and the opioids).

NSAIDs may predispose to peptic ulcers, renal failure, allergic reactions and hearing loss. They may also increase the risk of hemorrhage by affecting platelet function. The use of certain NSAIDs in children under 16 suffering from viral illness may contribute to Reye's Syndrome.

Opiates and morphinomimetics

Morphine,the archetypal opioid, and various other substances (e.g. Codeine, Pethidine, etc.) all exert a similar influence on the cerebral opioid receptor system. Dosing of all opioids may be limited by opioid toxicity (confusion, respiratory depression, myoclonic jerks and pinpoint pupils), but there is no dose ceiling in patients who tolerate this.

Opioids, while very effective analgesics, may have some unpleasant side-effects. Up to 1 in 3 patients starting morphine may experience nausea and vomiting (generally relieved by a short course of antiemetics). Pruritus (itching) may require switching to a different opioid. Constipation occurs in almost all patients on opioids, and laxatives are typically co-prescribed.

When used appropriately, opioids and similar narcotic analgesics are otherwise safe and effective, carrying relatively little risk of addiction. Occasionally, gradual tapering of the dose is required to avoid withdrawal symptoms.

Psychotropic agents

Tetrahydrocannabinol THC) and some other cannabinoids, either from the Cannabis sativa plant or synthetic, have analgesic properties, although the use of cannabis derivatives is illegal in many countries. Other psychotropic analgesic agents include ketamine (an NMDA receptor antagonist), clonidine and other α_2-adrenoreceptor agonists, and mexiletine and other local anaesthetic analogues.

Adjuvant analgesics

The use of adjuvant analgesics is an important and growing part of the pain-control field and new discoveries are made practically every year. Many of these drugs combat the side effects of opioid analgesics, an added bonus. For example, antihistimines including orphenadrine combat the release of histamine caused by many opioids, methylphenidate, caffeine, ephedrine, dextroamphetamine and cocaine work against heavy sedation and may elevate mood in distressed patients as do the antidepressants. A well-accepted benefit of THC to chronic pain patients on opioids is its superior anti-nauseant action. However, it would make more sense to use the Marinol capsule, or oral, rectal, or vapour administration of hash oil, rather than smoking cannabis, for the same reasons most doctors advise against smoking tobacco, even though it is more easily obtained.

Combinations

Analgesics are frequently used in combination, such as the paracetamol and codeine preparations found in many non-prescription pain relievers. They can also be found in combination with vasoconstrictor drugs such as pseudoephedrine for sinus-related preparations, or with antihistimine drugs for allergy sufferers.

The use of paracetamol, as well as aspirin, ibuprofen, naproxen, and other NSAIDs concurrently with weak to mid-range opiates (up to about the hydrocodone level) has been shown to have beneficial synergistic effects by combating pain at multiple sites of action—NSAIDs reduce inflammation which, in some cases, is the cause of the pain itself while opiates dull the perception of pain—thus, in cases of mild to moderate pain caused in part by inflammation, it is generally recommended that the two be prescribed together.

Topical or systemic

Topical analgesia is generally recommended to avoid systemic side-effects.

Painful joints, for example, may be treated with an ibuprofen- or diclofenac-containing gel; capsaicin also is used topically. Lignocaine, Tetracaine, Prilocaine and Benzocaine, (topical anesthetics), and steroids may be injected into painful joints for longer-term pain relief. Topical anesthetics are also used for painful mouth sores and to numb areas for dental work and minor medical procedures.

Addiction

In recent years, there has been a wave of new addictions to prescription narcotics such as oxycodone (or with acetaminophen) and hydrocodone (commonly prescribed with acetaminophen) when available in pure formulations as opposed to combined with other medications (as in products which contains both oxycodone and acetaminophen/paracetamol). Hydrocodone is only available in pure form in some European countries as the original hydrocodone pharmaceutical, Dicodid tablets. Far from reducing addiction liability, the paracetamol content of many codeine, dihydrocodeine, hydrocodone, and oxycodone pharmaceuticals in the United States only saddles users with the high risk of severe liver damage, and extraction of the opioids with cold water or solvents reduces this problem for the sophisticated abuser, self-medicator, and legitimate prescription holder alike.

In all of the above information, obtained from sites such as medical journals and even the TGA website, two things stand out;

1. All of the analgesics recommended (and sold OTC) do not work on the cause of the pain itself – only the sensation of pain. You may still be suffering from an acute or chronic problem but not feel any effects due to high analgesic dosages.
   This may be counterproductive and why is there a standard regulatory instruction "If the pain persists seek medical advice"?

2. There is no mention of Aromatherapy, which has been used in areas such as pain management for the last few thousand years.

Why?

What are the current "alternate medicine" products/systems for pain management?

Aromatherapy

Definition of an Essential Oil

An **essential oil** is any concentrated, hydrophobic liquid containing volatile aroma compounds from plants. They are also known as **volatile** or **ethereal** oils, or simply as the "oil of" the plant material from which they were extracted, such as *oil of clove*. The term **essential** indicates that the oil carries distinctive scent (essence) of the plant, not that it is an especially important or fundamental substance. Essential oils do not as a group need to have any specific chemical properties in common, beyond conveying characteristic fragrances. They may not necessarily all have strong odours and are not to be confused with essential fatty acids.

Essential oils are generally extracted by distillation. Other processes include expression, or solvent extraction. They are used in therapeutics, perfumes and cosmetics, for flavouring food and drink, and for scenting incense and household cleaning products.

Interest in essential oils has revived in recent decades, with the popularity of aromatherapy, a branch of medicine that has been used for thousands of years, which claims that the specific aromas carried by essential oils have curative effects. Oils are volatilized or diluted in carrier oil and used in massage, or burned as incense.

A Brief History

Essential oils have been used by man for thousands of years in one form or another. Their effectiveness has been well documented by healers and shamans throughout history in all cultures. Herbs, which contain essential oils are added to our cooking and impart valuable medicinal properties. Making our Christmas cake or pudding just wouldn't be the same without the peel of lemon & orange, which contain essential oils that help to preserve, flavour and add aroma.

The Egyptians had a highly advanced civilisation that recognised the importance of these extracts for health and beauty. They used them in everyday life and placed great value on them. They also used them to keep their skin supple in the hot, dry environment by adding base oils such as sweet almond and olive oil. In the reign of Rameses, the monument builders even went on strike because, as they wrote, *"we have no ointment".*

Hippocrates, the father of medicine, said that *"the way to health is to have an aromatic bath and scented massage every day"*. Why is it that our doctors of today have very little or no knowledge of Hippocrates' thoughts on the use of essential oils?

Famous for his prophecies is Michel de Nostredame (Nostradamus). But did you know that he spent most of his young years from the year 1521 to the year 1529 constantly on the move across various lands and countries to hear and find out the source and origin of plants? His book *The Cosmetics Manual* was written in 1555 in which he says of observing various women *"during my stays in many countries, even those where the women because of the swiftly passing years contrived secretly and by means of a subtle skill to hide and conceal the principal part of the body, namely the head, in order to show clear evidence that substances applied to the face have succeeded in deceiving the eyes of onlookers."*

The word "aromatherapy" comes from the title of a book, *Aromatherapie*, written by a French chemist and perfumer, Rene Maurice Gattefosse, and published in 1937. His story is often relayed, and began in July 1910 with an accident at work: *"In my personal experience, after a laboratory explosion covered me with burning substances which I extinguished by rolling on a grassy lawn, both my hands were covered with a rapidly developing gas gangrene. Just one rinse with lavender essence stopped 'the gasification of the tissue".*

Gattefosse was so impressed by the fact that lavender essential oil could effectively deal with this very serious condition, he started to investigate the chemical and healing properties of essential oils. He also drew on the experience of doctors using essential oils at the time, including those who had great success in healing soldiers' wounds during the First World War. He found they also had a significant role in the field of dermatology, and after carrying out research in his own laboratory in the therapeutic action of essential oils on the skin, he published *Beauty Products* in 1936, and *Physiological Aethetics* in 1938.

How Essential Oils Work on the Body

The ways in which essential oil molecules enter the body and have an effect are: by inhalation, by trans-dermal absorption and by ingestion. Essential oils increase the blood supply to the tissues, which helps the proliferation of cells and regeneration, increasing oxygenation and lymphatic flow. By increasing the micro-circulation in the skin and by strengthening the capillaries essential oils, such as cypress, lemon, rose and geranium, are useful for the treatment of spider veins and varicose veins.

Essential oils are very complex and contain many trace compounds – very small components, some of which may not even have been analysed scientifically. It is the combination of all its ingredients that make an essential oil what it is. Extracting one component generally won't work effectively without the other trace elements to provide balance. Also the better the quality of the essential oil, the more effective it will be in treatment. This is often called the "holistic" approach, in that one extracted component may not be as effective as the entire extract from the plant.

Essential oils work well in cosmetics and beauty treatments as anti-ageing agents because their properties work to stimulate skin cells into reproducing at a faster rate, and by protecting the body against free radicals (believed by many scientists to be the greatest cause of ageing). Skin that has been treated with essential oils becomes stronger, healthier and more even in appearance.

The improved circulation, which aids oxygenation, increases the rate at which nutrients are fed into the dermis. The production of the skin's sebum is influenced by hormones. Certain essential oils balance the rate which sebum is produced by the sebaceous glands, thereby encouraging healthy skin. As certain essential oils may influence the hormonal level it makes sense to include these as a treatment when dealing with skin problems that are caused by hormonal imbalances.

Others are anti-inflammatory and calm sensitive and damaged skin. Some such as fennel contain phyto-hormones which create equilibrium within our endocrine system and can be used in the management of menopausal symptoms such as hot flushes.

All essential oils are anti-bacterial in nature, some more than others. Oregano, for example, is twenty-six times more powerful as an antiseptic than phenol, which is the active ingredient in many commercial cleaning products. It has been shown that their antiseptic properties cause damage to a biological membrane due to their lipophilic properties (their solubility in the phospholipid bi-layer of cell membranes). According to *Knobloch*, the oxygen intake was completely inhibited by functional groups such as phenols (see Oregano above). Yet in correct dosages and applications they are completely

safe when used on the human body. They are probiotic or 'for life' as opposed to antibiotics which are 'against' life.

Some such as lemongrass contain anti-viral properties. Dr. Penoel suggested a combination of essential oils applied topically. The essential oils alter the pH and the electrical resistance of the terrain in a way which is unfavourable to the viral organism.

A combination of essential oils, well known to aromatherapists, is a combination of Tea Tree Oil, Pine Oil and Eucalyptus Oil with Lavender and Lemon Oils, has just been "discovered" by pharmaceutical chemists as a marvelous antiseptic, even effective against Golden Staph. a common infection in hospitals.

And finally the number of essential oils recommended for pain management is extensive and the main thrust of this paper. The beauty of this approach is that oils can be selected that not only have analgesic effects but also act on the cause of the pain, thereby (dare I say) curing the complaint as well.

Essential oils listed as having analgesic effects include:

Black Pepper (Piper nigrum); Cade (Juniperus oxycedrus); Chamomile German (Matricaria recutica); Clove Bud (Syzgium aromaticum); Coriander (Coriandrum sativum); Eucalyptus (Eucalyptus sp.); Fennel Sweet (Foeniculum vulgare); Frankincense (Boswelia carteri); Geranium (Pelargonium graveolens); Ginger (Zingiber officinale); Juniperberry (Juniperus communis); Lavender (Lavandula angustifolia); Marjoram (Origanum majorana); Niaouli (Melaleuca viridiflora); Neroli (Citrus aurantium amara); Origanum (Origanum heracleoticum carvacroliferum); Pine (Pinus sp.); Rosemary (Rosmarinus officinalis); Rosewood (Aniba rosaeodora); Sage (Salvia officinalis); and Tea Tree (Melaleuca alternifolia).

Development of a treatment based on Aromatherapy techniques.

The object of the development was to create an aromatherapy based oil that would have a demonstrable effect with respect to pain management.

Two products were developed based on available literature evidence.

Treatment #1 – A Calming Blend for Pain and Inflammation
INGREDIENTS: Lavender, Geranium, Sweet Orange, Lemon, Marjoram, Vetiver, Neroli, Petitgrain, Lemongrass, Bergamot & Cedarwood in a base of Sweet Almond, Wheatgerm And Macadamia Oils.

The basis of selection was not only on therapeutic effects but aromatic combinations as well. i.e.;

Oil	Therapeutic effects
Lavender	Analgesic, antiseptic, antispasmodic, hypotensive and sedative.
Geranium	as a sedative and uplifting for the nervous system.
Sweet Orange	Antidepressant, antispasmodic, sedative and lymphatic stimulant.
Lemon	Antirheumatic, antispasmodic, hypotensive, rubefacient and tonic.
Marjoram	Analgesic, antispasmodic, hypotensive, nervine and sedative.
Vetiver	Nervine, sedative, mild rubefacient and tonic
Neroli	Antispasmodic and nervine.
Petitgrain	Antispasmodic and sedative.
Lemongrass	Analgesic, sedative (nervous system) and tonic.
Bergamot	Analgesic, sedative and tonic.
Cedarwood	Sedative.

and

Treatment #2 – A Stimulating Blend for Pain and Inflammation
INGREDIENTS: Lavender, Geranium, Sweet Orange, Lemon, Lemongrass, Bergamot, Basil, Arnica, Sandalwood, Pine Needle & Rosemary in a base of Sweet Almond, Wheatgerm & Macadamia Oils.

The basis of selection was not only on therapeutic effects but aromatic combinations as well. ie;

Oil	Therapeutic effects
Lavender	Analgesic, antiseptic, antispasmodic, hypotensive and sedative.
Geranium	as a sedative and uplifting for the nervous system.
Sweet Orange	Antidepressant, antispasmodic, sedative and lymphatic stimulant.
Lemon	Antirheumatic, antispasmodic, hypotensive, rubefacient and tonic.
Lemongrass	Analgesic, sedative (nervous system) and tonic.
Bergamot	Analgesic, sedative and tonic.
Basil	Analgesic, antispasmodic and nervine.
Arnica	Anti-inflammatory and stimulant.
Sandalwood	Anti-inflammatory, antispasmodic, sedative and tonic.
Pine Needle	Antineuralgic, rubefacient and tonic.
Rosemary	Analgesic, nervine, rubefacient, stimulant and tonic.

But the question remained – how do you test the product to the satisfaction of the TGA or mainstream medicine? Certainly a double-blind cross-over trial would be out of the question as the "active" product would contain aromatic substances and the presence or absence of an aroma is immediately obvious to the participants. Like any clinical trial, including pharmaceutical, approximately 30% of the results can be put down to "the placebo effect".

What is Digital Infrared Thermal Imaging?

From the paper "The Physiological Basis for Clinical Thermography and the Detection of Infrared Radiation from the Human Body." By Peter Leando (Ref 11) I quote;
"The emissivity of human skin is almost 100% (close to black body emissivity) so the human subject is an ideal subject for thermographic imaging.
All thermographic images (thermograms) of the human body depend on the sympathetic control of skin blood-flow.
Only the dermal blood flow changes explain the heat seen on the surface of the body. The heat of a muscle, a joint or a bone is not conducted to the dermal tissues and cannot influence the dermal temperature recorded by thermography. Conduction of heat from the deeper portions of the body to the surface does not occur or create changes in the surface temperature.
The major basis of clinical thermography is the correlation of temperature recordings with various conditions from diseqase and injury as it relates to autonomic function."

Digital Infrared Thermal Imaging (DITI) is the only medically recognized method available to indicate pain location originating from vascular, muscular or skeletal systems. **Currently recognized by both the FDA and the TGA.** It is a non-invasive clinical imaging procedure for detecting and monitoring a number of diseases and physical injuries, by showing the thermal abnormalities present in the body. X-ray, C.T. Ultrasound and M.R.I. etc are all tests of "anatomy" that measure the structures of your body. DITI shows physiological change and metabolic processes using colour to visually represent these changes.

It is used as an aid for diagnosis and prognosis, as well as monitoring therapy progress, for conditions and injuries, including back injuries, arthritis, headache, nerve damage, unexplained pain, Fibromyalgia, RSD, Dental and TMJ, Artery inflammation, vascular disease, breast disease, carpal tunnel syndrome, disc disease inflammatory pain, skin cancer, referred pain syndrome, pain/strain, whiplash and digestive disorders.

Clinical Trials

Thermography Australia was contracted to perform research screening on two topically applied essential oils products provided.

Treatment #1 is a blend of essential oils of marjoram, lavender, vetiver, geranium, sweet orange, lemon, neroli, petitgrain, bergamot, lemongrass and cedarwood.

Treatment #2 is a blend of essential oils of lemongrass, lavender, geranium, sweet orange, lemon, bergamot, basil, arnica, sandalwood, pine needle and rosemary.

Both are blended in carrier oils of sweet almond, wheatgerm and macadamia oils and are formulated using traditional therapeutic knowledge of essential oils, to reduce pain and inflammation.

In order to conduct a Digital Infrared Thermal Image the patient is first introduced into a temperature controlled environment and the body allowed to "equilibrate" to the room temperature. This discounts any exercise or ambient temperature causing incorrect readings.

Thermography Australia provided the symptomatic patients. Approximately 5mls of the products were applied very lightly to the skin, no massage employed, and images taken at the stated time intervals, before application and between 3-5 minutes after application. The patient was not allowed to exercise, move or go outside the temperature controlled environment and the machine settings remained constant, during the test period.

It must be noted that we had tried half body trials, hoping to achieve a control at the same time as the trial, however due to circulatory blood flow referred effects were noted in both sides within the minimum three minute elapsed time and, hence, the effect could not be achieved.

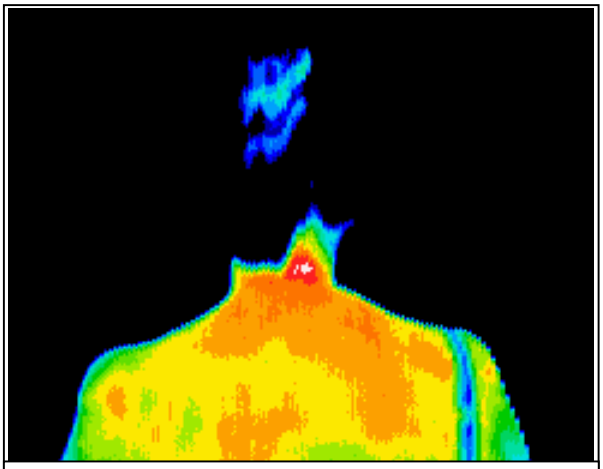
However in one particular test the abdominal area of a patient with bowel disease and pain was scanned. The response following the application of the Treatment #1 product indicating the additional effect of the Sympathetic Nervous System response to the dermal application of the product.

Results

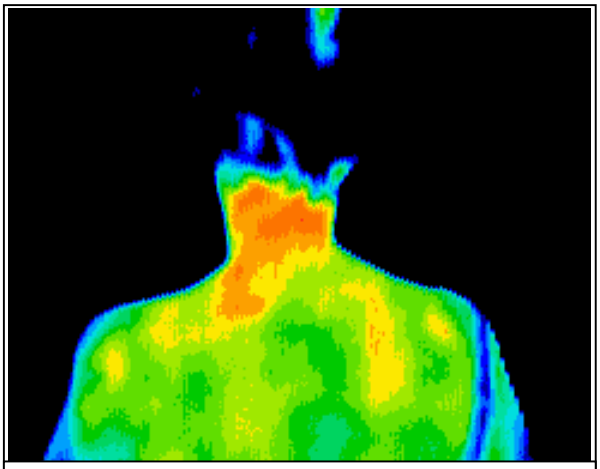
Aust L 69574 Treatment #1 – A Calming Blend for Pain and Inflammation.

Images show before and after application on Neck and Shoulder area (no massage) of Aust L 69574 Treatment #1 – A Calming Blend for Pain and Inflammation.

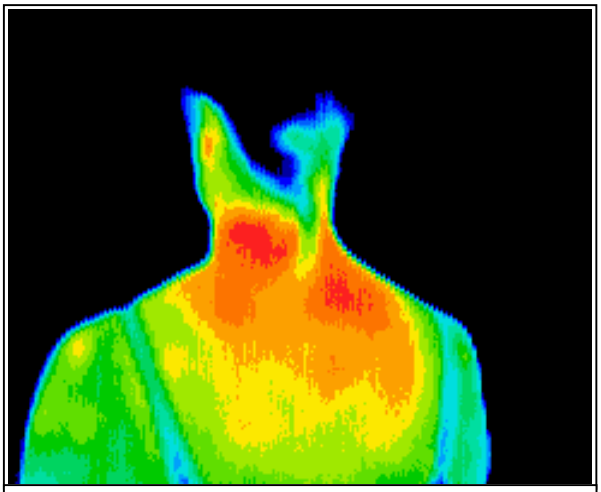
Note
White colour indicates extreme pain, followed in intensity by red, orange and yellow.
Green indicates absence of pain.



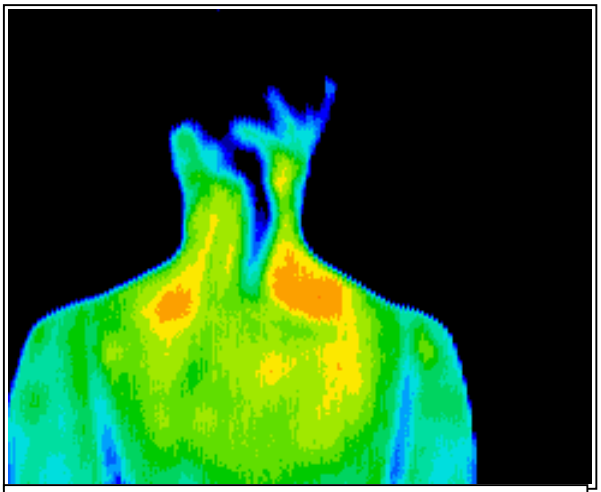
Back View Neck & Shoulder Pain **before** applying Aust L 69574 Treatment #1.



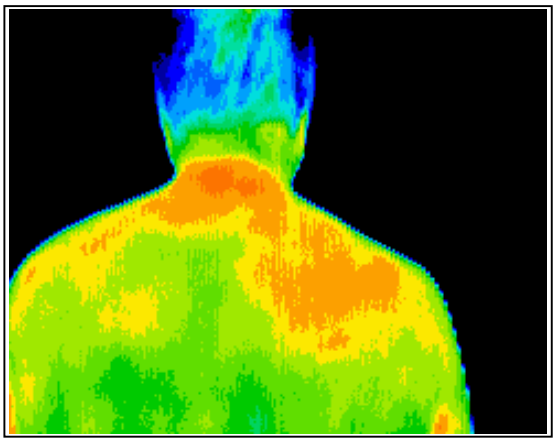
Back View Neck & Shoulder Pain 3 minutes **after** applying Aust L 69574 Treatment #1.



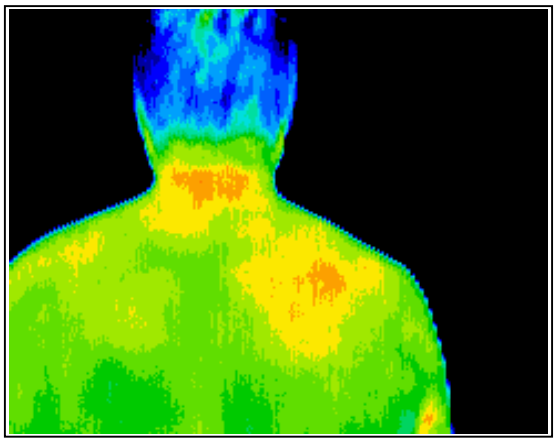
Back View Neck & Shoulder Pain **before** applying Aust L 69574 Treatment #1.



Back View Neck & Shoulder Pain **3 minutes after** applying Aust L 69574 Treatment #1.



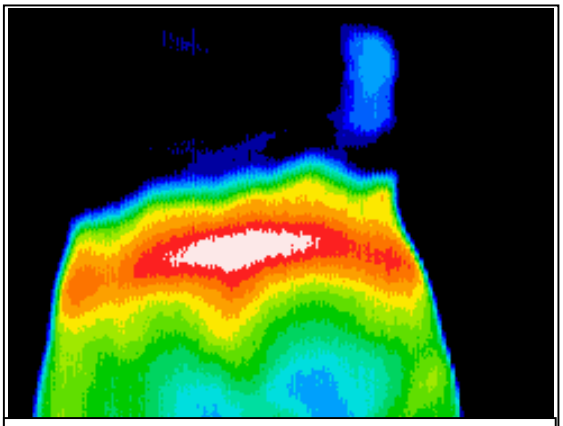
Back View Neck & Shoulder Pain **before** applying Aust L 69574 Treatment #1.



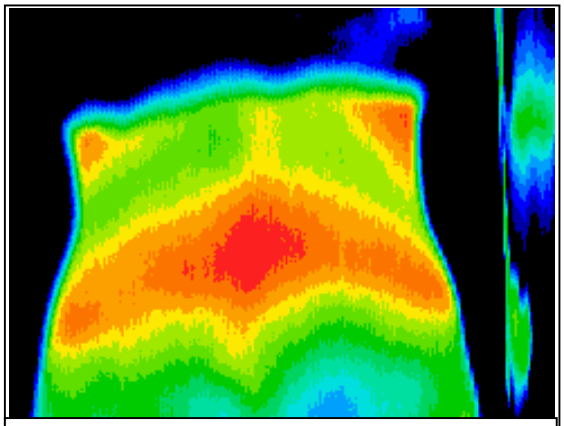
Back View Neck & Shoulder Pain **3 minutes after** applying Aust L 69574 Treatment #1.

Images show before and after application on Abdominal area (no massage) of Aust L 69574 Treatment #1 – A Calming Blend for Pain and Inflammation.

White colour indicates extreme pain, followed in intensity by red, orange and yellow.
Green indicates absence of pain.
Images show the additional effect of the Sympathetic Nervous System.
Note also the anti-spasmodic effect of the essential oil product.

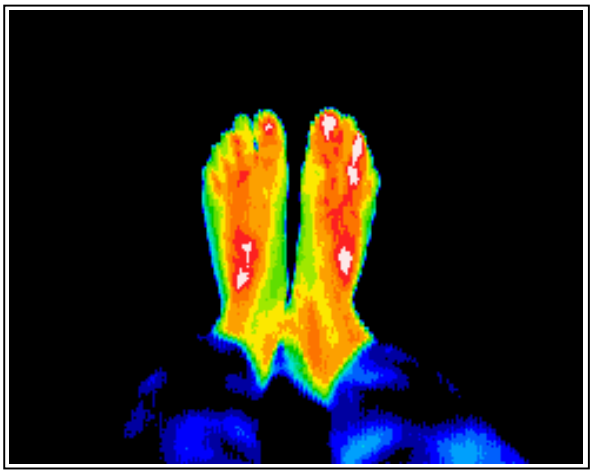


Front View abdominal area **before** applying Aust L 69574 Treatment #1.

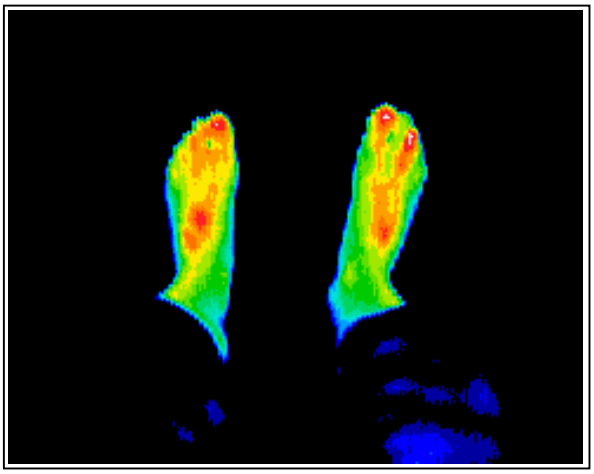


Front View abdominal area 3 minutes **after** applying Aust L 69574 Treatment #1.

Images show before and after application on Feet area (no massage) of Aust L 69574 Treatment #1 – A Calming Blend for Pain and Inflammation.



Front View arthritis in feet **before** applying Aust L 69574 Treatment #1.

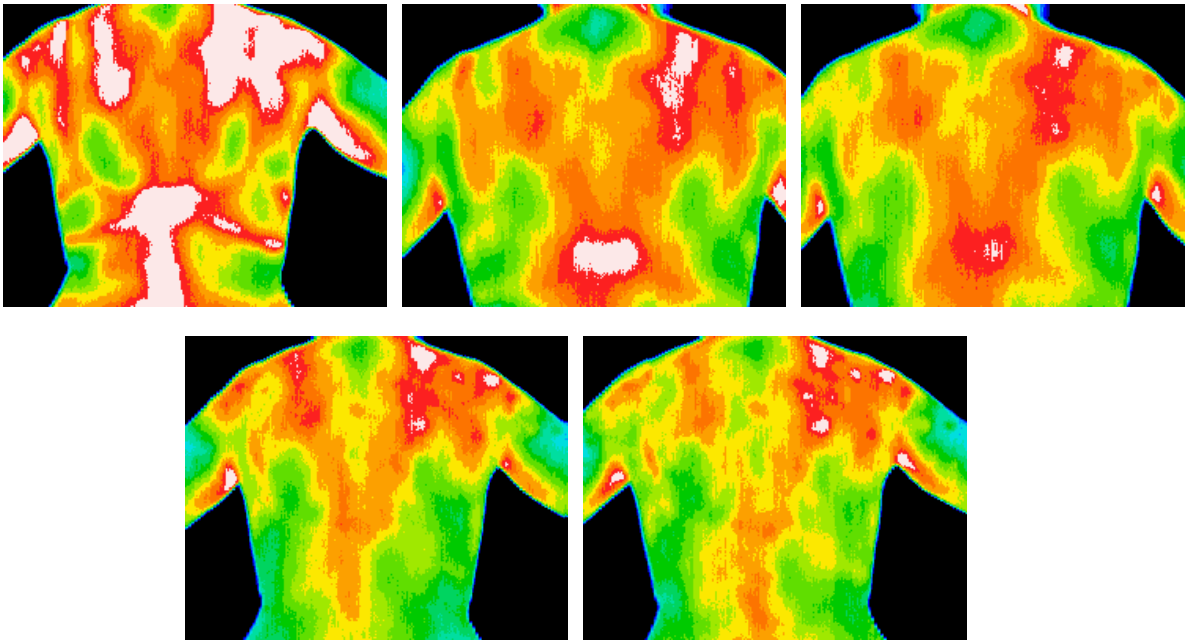


Front View arthritis in feet **3 minutes after** applying Aust L 69574 Treatment #1.

Aust L 69575 Treatment #2 – A Stimulating Blend for Pain and Inflammation

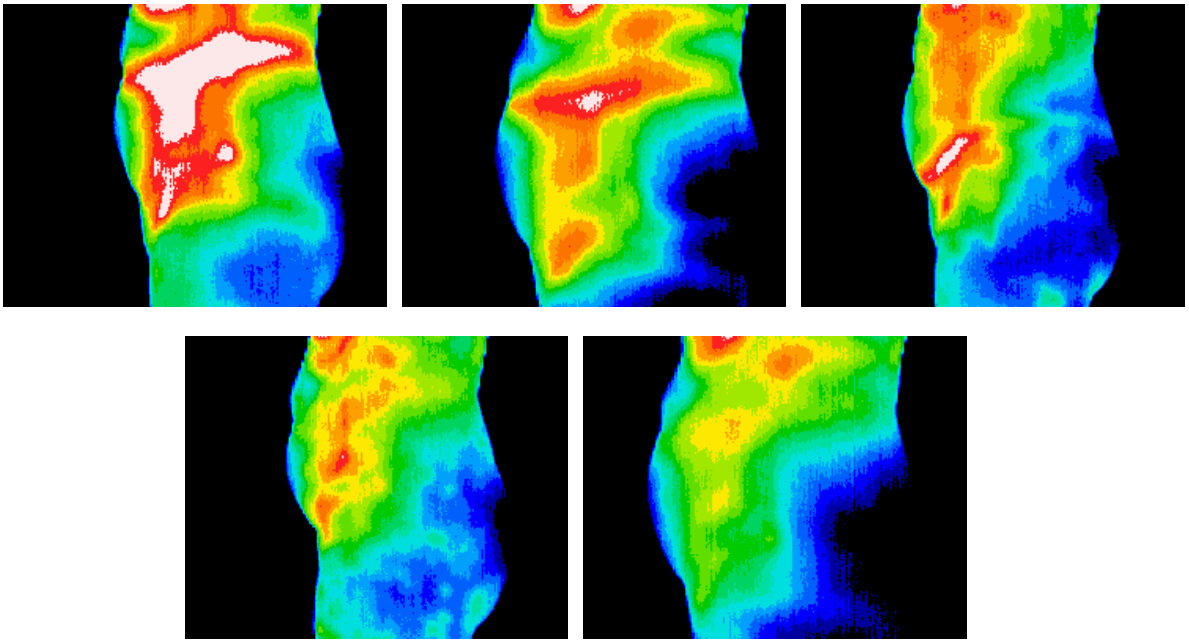
Note
White colour indicates extreme pain, followed in intensity by red, orange and yellow.
Green indicates absence of pain.

Image shows before and after application on Upper Back area (no massage) of Aust L 69575 Treatment #2 – A Stimulating Blend for Pain and Inflammation.



Note the progression of reduction of pain from initial to 5 minutes after application.

Image shows before and after application on Abdominal Strain (no massage) of Aust L 69575 Treatment #2 – A Stimulating Blend for Pain and Inflammation.



Note the progression of reduction of pain from initial to 5 minutes after application.

Conclusion

I hope what we have provided here is firstly proof that aromatherapy based products have a demonstrable effect on the management of pain in the human body and, secondly, that Digital Infrared Thermal Imaging is a simple, viable and accurate method of detecting the level of pain experienced by the patient.

You can also be assured that we are continuing development of techniques to prove aromatherapy does work, to the satisfaction of regulatory authorities, the medical profession and the general public.

I thank you for your time.

Footnotes

The products tested were:

(Aust L 69574 Treatment #1) **BE Relieved – A Calming Blend for Pain & Inflammation** and

(Aust L 69575 Treatment #2) **BE Sport – A Stimulating Blend for Pain & Inflammation**

both currently marketed by;
Balanced Essentials Pty Limited. P.O. Box 276 Glenorie, NSW, 2157

This exciting research consolidates the company's claims and the vast number of testimonials held by Balanced Essentials.

References and background reading;

1. Aromatherapy - Essential Oils in Colour
   Rosemary Caddy
   Amberwood Publishing ISBN 1 899308 14 8

2. Aromatherapy - the Essential Blending Guide
   Rosemary Caddy
   Amberwood Publishing ISBN 1 899308 24 5

3. Complete Guide to Aromatherapy
   Salvatore Battaglia
   International Centre of Holistic Aromatherapy - ISBN: 0 646 42896 9

4. Cosmeceuticals: Active Skin Treatment
   Cosmetics & Toiletries compilation
   Allured Publishing - ISBN: 0-931710-92-8

5. Delivery System Handbook for Personal Care and Cosmetic Products
   Technology, Applications and Formulations
   Edited by Meyer R Rosen
   William Andrew Inc - ISBN: 0 8155 1504 9

6. Encyclopedia of Essential Oils
   Julia Lawless
   Element - ISBN: 1 85230 411 5

7. Herbal Treatment for Common Ailments
   Gregory Ah Ket
   Compendium - ISBN: 0 908136 01 3

8. Uses of Natural and Organic Ingredients
   Presentation to NSW CAPSIG Meeting – December 5, 2007
   Canterbury-Hurlstone Park RSL
   Ric Williams

9. http://www.tga.gov.au Website
   January 2008

10. http://www.medinfo.co.uk Website
    January 2008

11. The Physiological Basis for Clinical Thermography and the Detection of Infrared Radiation from the Human Body
    Peter Leando, PhD
    First published - Australian Thermography Association Journal, 1998

Cheryl Gilbert - Bio

Cheryl Gilbert is the owner, creator and the energy behind Balanced Essentials since its inception over 12 years ago. It began as a love of fragrance, when as a child she mixed her aunt's expensive French perfumes. Her guiding inspiration came after working as a trainee nurse 20 years ago where she recognized that to facilitate true healing, the emotional, physical and spiritual needs of the individual must all be addressed.

An intense interest in Aromatherapy and a desire to create her own product range developed into producing the Balanced Essentials range. Through owning and operating her own shop in 1995, she recognized the need and desire for aromatherapy products to be simple and easy to understand. Using an intuitive and innate olfactory ability to blend aromatics and using knowledge gained in medical, therapeutic, alternative and complementary health fields, she has developed a unique range of essential oil products, and is passionately engaged in ongoing development and research to prove their use and efficacy. Currently, her aim is to encourage the acceptance of aromatherapy as a first-measure treatment of pain and inflammation.

In 2000 Cheryl developed and listed with the Therapeutic Goods Administration three products:
BE Relieved – A Calming Blend for Pain & Inflammation,
BE Sport – A Stimulating Blend for Pain & Inflammation, and
BE Lite for Cellulite. BE Lite for Cellulite was developed for aiding in the treatment of cellulite and for detoxing the body.
These products are the premier products of the company and are some of the most potent available in the market today.

Cheryl's products – the Balanced Essentials range – has been one of the top three ranges ever promoted on TVSN (The Television Shopping Network Channel on Foxtel & Optus) in the Health & Beauty category, and have held the records for the largest amount of sales in one day and the fastest sales of any product. BE products also have the reputation of having the highest repeat sales to existing customers and the least number of product returns. Her live TV shows throughout Australia & New Zealand attracted a large audience of customers. Their comments and testimonials to the incredible effectiveness of the products outnumber any that has ever been received by TVSN.

Pauline Rose - Bio

Pauline has over 30 years experience in the health care industry. She is a Nurse Consultant in Bio-Energetic Medicine, a registered Nutritionist, a registered Thermographer and has post graduate qualifications in diverse areas such as Neurosurgery and Environmental Medicine. While working and studying as a nurse in New Zealand, Papua New Guinea, England and Australia experience has given Pauline a very broad understanding of the health field. Holding Senior Clinical and Administrative positions in these countries, Pauline had the honour of being the youngest Matron ever to be appointed in Australasia by the Department of Health, when appointed to that position at Loloho Hospital in Papua New Guinea. In 1985-1986 Pauline chaired the Committee of Investigation in Women's Health Services (NZ).

Following advances in the analysis and treatment of health problems using newly developed technology, Pauline established her own clinic in 1994 and merged this with

"Complementary Medicine" a few years later, to provide a quality integrated holistic health clinic.

Pauline topped the Advanced Certificate exams in Bio-Energetic Medicine (American Institute of Energy Medicine) in 2000 and is also a qualified Thermographer.

Pauline has been a pioneer in her field for many years. She has been pro-active in introducing many aspects of Bio-Energetic Medicine to Sydney and is responsible for the development of the Dental Compatibility Testing Program.

Pauline has lectured in aspects of Bio-Energetic Medicine to the Energy Medicine Conference as well as being a frequent guest lecturer at Nature Care College, in Sydney. Pauline is also a committee member of the Australasian Bio-Energetic Medicine Association. This group represents health care interests to the Government and Health Department. She also serves on the NHCA.

Ric Williams- Bio

Ric was educated in Sydney (N.S.W.) obtaining his Bachelor of Science in Pure and Applied Chemistry from the University of New South Wales (1980) and a Diploma of Environmental Studies from Macquarie University in 1983.

Ric began work at Sterling Pharmaceuticals (Sydney) in 1969 as a quality control trainee chemist, then moved on to Colgate-Palmolive, S.C.Johnson & Son and Lever-Rexona where he worked in Research & Development areas rising to supervisory level. In 1985 Ric relocated to Adelaide where he took up a seven year appointment with the Australian pharmaceutical company F.H.Faulding & Co. Ltd. becoming the manager of their Consumer Products Research and Development Laboratory; then three years as a consultant in Adelaide.
Since returning to Sydney, Ric has worked for many companies under contract basis (mainly as Technical Manager), including Cosmetic Concepts Pty Ltd; Scental Pacific Pty Ltd; Ortron Corporation; Medical Research Pty Ltd. (six years); Jasol Australia Pty Ltd; Ultraceuticals Pty Ltd; and New Directions Australia Pty Ltd.
Ric is currently employed by NxGen Pharmaceuticals Pty Ltd as their Research & Development Manager.

Ric has written a column in "Cosmetics, Aerosols and Toiletries in Australia" (the magazine of the Australian Society of Cosmetic Chemists) and has presented many lectures and workshops at national conferences of the Australian Society of Cosmetic Chemists.
He has also lectured to trainees at beauty colleges on a contract basis and recently was invited to join the advisory committee formed to establish a Bachelor of Pharmaceuticals at the University of Western Sydney.
Ric is also currently writing a book on Cosmetic Science aimed at junior chemists in the cosmetics industry and trainee beauty therapists.
Ric was a Council Member of the Australian Society of Cosmetic Chemists for a total of 14 years and is currently on their Technical Committee for which he has served since 1985.