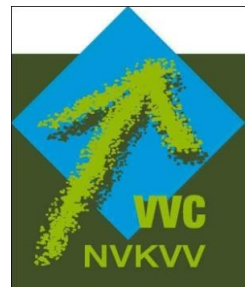


# Thesis

## Postgraduate Acupuncture - PGAC

Effectiveness of acupuncture in  
chronic scar pain and itching after burns



**Offered by: Tina Vervloet**

**Supervisor: Henri De Lil**

**Academic year: 2022-2023**

**This thesis has been translated from Dutch. My apologies for any translation errors.**

## Summary / Abstract

**ENG** Acupuncture is widely used in the world to address all kinds of pathology (in the broad sense of the word). The question that this thesis aims to answer is whether acupuncture is appropriate to relieve chronic scar pain and itching after burns, as several studies have shown that conventional therapies do not provide sufficient relief.

There is little to no research available in the literature that adequately answers this question. Almost every discussion mentions that there is too much bias to conclude that acupuncture has proven effects toward pain and itch relief after burns and that more research is needed.

The decision came down to a question: Is it at all possible to use a standardized protocol in acupuncture treatment?

**FR** L'acupuncture est largement utilisée dans le monde pour traiter toutes sortes de pathologies (au sens large). La question à laquelle cette thèse vise à répondre est de savoir si l'acupuncture est appropriée pour soulager les douleurs et les démangeaisons chroniques des cicatrices après des brûlures, car plusieurs études ont montré que les thérapies conventionnelles ne procurent pas un soulagement suffisant.

Il y a peu ou pas de recherches dans la littérature qui répondent adéquatement à cette question. Presque toutes les discussions mentionnent qu'il y a trop de biais pour conclure que l'acupuncture a des effets prouvés sur le soulagement de la douleur et des démangeaisons après une brûlure et que des recherches supplémentaires sont nécessaires.

La décision s'est résumée à une question : est-il possible d'utiliser un protocole standardisé dans le traitement par acupuncture ?

**NL** Acupunctuur wordt in de wereld breed ingezet om allerlei pathologie (in de brede zin van het woord) aan te pakken. De vraag die dit eindwerk wil beantwoorden is of acupunctuur aangewezen is om chronische littekenpijn en -jeuk na brandwonden te verlichten, daar in verschillende onderzoeken is aangetoond dat de conventionele therapieën onvoldoende soelaas brengen.

In de literatuur is er weinig tot geen onderzoek voorhanden die deze vraag voldoende beantwoordt. In bijna elke discussie wordt vernoemd dat er teveel bias bestaat om te kunnen besluiten dat acupunctuur bewezen effecten heeft naar pijn- en jeukstilling na brandwonden en dat er meer onderzoek nodig is.

Het besluit is uitgekomen op een vraag: Is het überhaupt wel mogelijk om een gestandaardiseerd protocol te gebruiken bij een acupunctuurbehandeling?

## Foreword

The Dutch burn care website states, "Burns are the most serious injuries that exist and can cause permanent damage." From the experience within my family, this sentence painfully brings back memories of that period vividly. I can agree that this sentence is true. I don't have to do any scientific research for that. This paragraph briefly describes my motivation for this thesis.

So the question of what topic I was going to write my thesis on was quickly answered. It has been an exciting search, with some frustration around the scant information I could find on the subject. This feeling changed in December 2022 when I had a conversation with Yvonne Farrell about my thesis topic during her lecture on divergent meridians. She made me aware that the fact that I had chosen this topic, it was important enough for ME and thus it was interesting to start considering everything and thinking in hypotheses. This gave me a new drive, everything started flowing again and I dared to think beyond what could be found in the literature.

The beginning has been made with this thesis, but far from finished.

I would like to thank several people, because without them, this thesis could not have come about.

My family: Davy, Wout, Hanne and Toon, they have been incredibly patient with me. As guinea pigs and soundboards, they have been able to tolerate my presence and absence.

The teachers of OTCG for their unstoppable perseverance in taking us students into the story of Chinese Medicine and molding us into the acupuncturists we are today. Special thanks to Jelle Geys for winning me over to start this study, for the many encouragements and congratulations, for the countless times "did I help you now or did I make it harder?" after my countless questions. Last but definitely not least: Thank you to Henri De Lil, my mentor, for re-reading my texts over and over again and for his hard and at the same time gentle way of responding, which brought me closer to a worthy thesis and thus enabled me to write a better version each time.

To my friends and family I say a Thank You for supporting me, helping me bear my little edges, doubts and worries, and burning candles for me during my exams. In particular, I would like to mention my friends Eef Michiels and Valérie Gielen for checking my spelling.

Two people who have been in the business for many years and recently came on my path:

Saskia Voeten: Thanks for proofreading for content and thinking along!

Yvonne Farrell: Thank you so much for reading and thinking along about the psychological-emotional part of my essay. You were (and are!) a great help and inspirer!

## Table of contents

Summary.....	2
Foreword.....	3
1. Introduction .....	6
2. Literature review .....	8
2.1. Conclusions from the scientific literature .....	14
2.2. Development of protocols.....	14
2.3. Comorbidity.....	15
3. Burn injuries according to Western approach.....	16
3.1. Burn .....	16
3.2. Normal wound healing .....	17
3.2.1. Inflammatory phase .....	17
3.2.2. Proliferation Phase.....	17
3.2.3. Remodeling phase.....	18
3.3. Scarring.....	18
3.4. Causes of scar pain .....	20
3.5. Causes of itching.....	21
3.6. Prevalence scar pain and itching.....	22
3.7. Treatment.....	24
4. Burns according to Traditional Chinese Medicine: history.....	25
4.1. External treatment .....	27
4.2. Internal treatment.....	28
4.3. Early stage .....	28
4.4. Middle stage .....	28
4.5. Final stage.....	29
5. Burns according to Traditional Chinese Medicine: present day.....	30
5.1. Scarring.....	30
5.2. Scar pain .....	30
5.3. Pruritus .....	31
5.4. Treatments .....	32
5.4.1. (Sub)Acute burn care .....	33

5.4.2.	Pain.....	34
5.4.3.	Itch.....	36
5.4.4.	Surrounding the dragon .....	40
5.4.5.	Needle stimulation.....	42
5.4.6.	Bi-syndrome .....	45
5.5.	Hypothesis: the use of muscular and divergent meridians.....	46
5.5.1.	Hypothesis 1.....	48
5.5.2.	Hypothesis 2.....	51
6.	Discussion .....	54
7.	Conclusion.....	56
8.	References .....	57

## 1. Introduction

"Burns are the most serious injuries that exist and can cause permanent damage," according to the Dutch Burn Care website.

Patients with burn scars experience pain, color difference, hard textures, numbness, burning and/or itching sensations, movement restriction and local pigmentation problems. Pain and itching are the most common and hampering symptoms that 25% to nearly 50% of these patients experience on a daily basis. For many years after hospitalization, these scars can cause symptoms.

Normal wound healing is a complex process of inflammation, proliferation and remodeling. A scar is formed that is virtually invisible and asymptomatic. With a disrupted healing process, as occurs in burns, an abnormal scar is formed. The extent to which this occurs depends on several factors: Western, such as the degree of the burn, genetics and mechanical forces on the wound, among others, and Eastern, such as a predisposition of damp, the degree of blood stagnation, invasion of toxic heat, and so on.

Abnormal scars are classified into three groups. This classification is Western and Eastern similar. In hypertrophic scars, the scar tissue is raised at least a mm above skin level, but it does not step outside the boundaries of the original wound. Keloid scar tissue extends beyond the boundaries of the original wound, also affecting healthy skin. Atrophic scars show depression in the skin.

On a psychosocial level, problems can also arise. More than a quarter of people with burns experience discomfort with these "invisible scars. Problems such as depression, disturbed sleep, concentration and memory, post-traumatic stress symptoms, complicate recovery.

Conventional treatments do not provide adequate solutions to deal with long-term scar pain and itching. Some patients, despite thorough therapies, retain these (debilitating) residual symptoms throughout their lives.

With this thesis, I aimed to answer the question of whether chronic scar pain and itching could be relieved with acupuncture. Old and new books and scientific literature were searched for points, pattern differentiations and special techniques, including surround the dragon, needle rotation and bi-syndrome treatment. These techniques were already found in ancient writings. In the Ling Shu "The Yellow Emperor's Internal Classics" one already found a text around surround the dragon: "The fifth technique is Yang Ci, a needle in the middle and four needles around it. The needles are inserted superficially to treat a large area." Other authors also reported these techniques as being a good way to treat scars.

Several authors found that acupuncture has a stimulating effect on wound healing, thereby shortening wound healing and reducing scarring.

After the disappointment on quantity and quality from the scientific arsenal and after Yvonne Farrell's inspiring lecture, I started thinking more broadly and two hypotheses formed to perform treatments using the theory around sinews and divergent meridians.

Burns cause visible and invisible scars. Could it be the combination of the two that causes current research and treatments to provide insufficient relief? Then we face the enormous challenge of searching for the deeper underlying factors to assist these people in processing both.

## 2. Literature review

The goal was to investigate whether acupuncture is effective in reducing symptoms of burn scars such as pain and itching.

An initial search on Pubmed was done using the following keywords:

*Acupuncture OR dry needling OR needling  
AND  
Scar OR cicatrix OR healing OR inflammation OR pruritus OR neurogenic*

The text used in the title, abstract and keywords was analyzed to assess whether the search terms were sufficient. Because few relevant studies were found after initial searches, the inclusion criteria were expanded to include electro-acupuncture and the use of an indwelling needle.

Reference lists of all included articles were searched for further references, as well as relevant acupuncture textbooks, Sci-Hub and Google Scholar. Scientific studies were included. Opinion articles and reviews were excluded, but these were searched for relevant references.

Studies published before November 2022 and freely available were eligible for inclusion. Non-English language studies, with abstracts published in English, were translated with Google Translate and screened for valuable information.

The inclusion criteria were human participants with hypertrophic, atrophic or abnormal scars treated with acupuncture.

Treatments that were specifically excluded were applications with Chinese herbs and other forms of acupuncture, e.g., with hollow needles, injection acupuncture, laser acupuncture and acupressure.

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(("acupunctural"[All Fields] OR "acupuncture"[MeSH Terms] OR "acupuncture"[All Fields] OR "acupuncture therapy"[MeSH Terms] OR ("acupuncture"[All Fields] AND "therapy"[All Fields]) OR "acupuncture therapy"[All Fields] OR "acupuncture s"[All Fields] OR "acupunctured"[All Fields] OR "acupunctures"[All Fields] OR "acupuncturing"[All Fields] OR ("dry needling"[MeSH Terms] OR ("dry"[All Fields] AND "needling"[All Fields]) OR "dry needling"[All Fields]) OR ("needle s"[All Fields] OR "needled"[All Fields] OR "needles"[MeSH Terms] OR "needles"[All Fields] OR "needle"[All Fields] OR "needling"[All Fields] OR "needlings"[All Fields])) AND ("cicatrix"[MeSH Terms] OR "cicatrix"[All Fields] OR "scar"[All Fields] OR ("cicatrix"[MeSH Terms] OR "cicatrix"[All Fields]) OR ("healed"[All Fields] OR "wound healing"[MeSH Terms] OR ("wound"[All Fields] AND "healing"[All Fields]) OR "wound healing"[All Fields] OR "healing"[All Fields] OR "healings"[All Fields] OR "heals"[All Fields] OR "heals"[All Fields]) OR ("inflammation"[MeSH Terms] OR "inflammation"[All Fields] OR "inflammations"[All Fields] OR "inflammation s"[All Fields]) OR ("pruritus"[MeSH Terms] OR "pruritus"[All Fields]) OR ("neurogenic"[All Fields] OR "neurogenically"[All Fields] OR "neurogenics"[All Fields] OR "pain"[All Fields]))))
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→ 460 results Pubmed



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→ 361 results Pubmed

→ Filters English + Dutch: 803 results

→ After deduplication, screening by title and article: 58

→ After reading text diagonally: 27 (6 animal, 4 electro, 5 non-burn, 2 old, 1 foot reflex, 4 scientific effect, 5 ok burns)

→ Further hand-searched:

- Articles + 25
- Books: 2

→ After deeper reading: 34

→ Effective use for thesis:

In order of importance on the evidence-based scale, I found these articles:

- 0 meta-analyses,
- 3 randomized controlled trials,
- 9 literature reviews and
- 11 single reports.

Animal studies were excluded because information from these studies was also incorporated into other studies.

This first table collects the data from three randomized controlled trials: the scar type, what treatment was administered to the control group, how many patients participated in the study, what treatment was performed, where the needles were placed, how many treatments were required, what scores were taken, and finally what results were achieved.

RCT	Kotani et al. (2001)	Song et al. (2011)	Loskotova & Loskotova (2017)
Scar type	abdominal surgery	hypertrophic scar after burns	acute burns
Control group	sham acupuncture	ultrasound and scar ointment	standard care
Number of participants	70	80	1008 persons over 32 years; comparison for 198 with acu and 63 without acu
Type of treatment	intradermal needle	acupuncture	acupuncture
Needle location	local sores around the scar	local	points bilaterally, with combination of LI4, LI11, ST 36 and LU7 depending on accessibility on normal skin
Treatment frequency	20 treatments in 4 weeks	10 treatments over 10 weeks	daily, 30 min; unclear number
Type of scoring	Visual Analogue Scale, Quantitative Sensory Testing	measurement of pain, itching and suppleness on 3-point scale	qualitative appearance of burn wound, color and presence of hypertrophy
Results	70% in treatment group had good to excellent results	93.9% effective for the treatment group and 77.8% for the control group after 1 year	treatment with acupuncture within 48 h: complete healing without hypertrophy in 6 weeks

Nine literature reviews are listed in the following table. They are reviews with different approaches: not all of them deal with burn pain and itching. Nevertheless, because they somehow contribute to acupuncture treatments of residual symptoms after healing, they were included in the list.

Literature review	Result
Choinière et al. (1991)	35% have daily pain, 82% have daily paresthesia, time brings no improvement weather changes, size of scar, skin gap play big role
Yu et al. (2015)	acupuncture could improve itching in itch-related pathology
Lee Jieun (2017)	acupuncture has significantly improved wound healing, pain and itching
van den Berg-Wolf (2017)	acupuncture in skin problems shows promise with respect to itching and wound healing
Aval et al. (2018)	acupuncture is effective in treating uremic pruritus
Tuckey (2019)	all studies reported positive results, despite different treatments. more research is needed
Hwang (2021)	acupuncture can reduce itching, but not in all pathologies more large-scale research is needed
Kim et al. (2021)	there is no conclusive evidence that acupuncture can support the treatment of itching, due to bias
Abd-Elsayed (2022)	burn scars remain painful in 25-68% of patients and are associated with reduced quality of life due to decreased range of motion and to sensory symptoms such as itching and pain

The table below lists eleven case studies. Nine of them deal with the surround the dragon technique and one deals with pain during wound care and one with burns in emergency rooms. In processing the data, the focus was on the details of acupuncture treatment: what type of scar was treated, where the needles were placed, how many treatments were needed, how long they lasted, whether needle manipulations were performed and what the final result was.

Case study	Redfearn (1992)	Xia et al. (2002)	Hunter (2011)	Foell (2012)	Anderson (2014)
Scar type	abdominal scar after surgery	burns	scar after wrist surgery	non-closing wound gangrene	Operation Dupuytren
Needle location	locally, 1 inch from the edges of the wound ( 8 needles for 12 cm length)	wrist and ankle	Locally, needles of 0.20 x 15mm around scar, 1 cm apart, as close to scar as possible	local	Local + LI4 and HT7
Treatments	7 treatments for 1 week	treatment during wound care	8 treatments over 4 months	3 treatments over 3 weeks	7 treatments over 3 months
Length of treatment	20 minutes	to end wound care	N/A	25-45 minutes	N/A
Needle manipulation	yes	no	no	no	no
Results	No need for pain medication after first treatment	pain reduction	symptom-free, scar flatter	wound closure	improved joint mobility, skin color and dullness

Case study	Fang (2014)	Khan & Das (2019)	Chin (2020)	Godley (2020)	Tuckey (2022)	Bintoro et al (2022)
Scar type	scar on thigh after surgery	postoperative neuralgia at the level of thigh	(burn) wounds emergency	Soft tissue irritation around base metatarsal 5	hypertrophic scar after burn and skin grafting	scar pain after laparotomy
Needle location	local and distal (LI4, LR3 and ST36 + TCM diagnosis)	local	mostly LI 4, LR 3 + ear	local + KI1 and SP6	local	ear + local
Treatments	8 treatments in 5 weeks	8 treatments	average 5	1 to 4	12 treatments over 7 weeks	12 treatments over 8 weeks
Length of treatment	20 minutes	1 hour	N/A	10 - 20 minutes	N/A	30 minutes
Needle-manipulation	no	no	N/A	yes to deqi	no	no
Results	pain decreased from 7/10 to 1-2/10 on Likert pain scale	pain reduced by 50%	symptom-free	symptom-free	symptom-free except during heat and friction	symptom-free

## 2.1. Conclusions from the scientific literature

Without meta-analyses, only three randomized controlled trials, nine literature reviews and 11 single reports, there is too little validated input to draw valuable conclusions. There is too little standardization, too much bias and too much empiricism.

Although almost every article in itself indicates that the treatments performed are effective in that moment and in that patient(s), the authors say more evidence-based research needs to be done to decide whether acupuncture is appropriate for pain and itching after burns. They say these studies do provide good starting points and inspiration for setting up further studies.

## 2.2. Development of protocols

A number of literature reviews were conducted where it was concluded that there were insufficient research findings and where this led the authors to develop a protocol for further research.

Study	Technology	Rotation	Duration	Number of treatments	Measuring tool
Rozenfeld (2020)	STD, 0.25mm x 30mm, 0.5cm to 1cm apart, angle of 30-45 degrees toward scar	within pain threshold	20 min	1 or 2 times a week until symptom plateau or until resolved	N/A
Liu (2020)	STD, min 4 needles, max 15 (depending on scar size), needles 3 cm apart, insertion 1 to 1.5 cm	2 times	30 min	Treatment once every 2 days for 30 days	Visual Analogue Scale
Tuckey (2022)	Local and distal acupuncture after standard scar massage, number of needles depending on scar size	to deqi according to certain interval	+15 min	6 treatments over 4 weeks	Visual Analogue Scale and Patient and Observer Scar Assessment Scale.

Liu's protocol is said to be currently under investigation, but to date (February 2023) no article has been published on it.

### 2.3. Comorbidity

Due to the trauma of a burn accident, additional psychosocial problems may develop, which in turn brings increased residual symptoms. This creates a vicious cycle of accumulation and increase in physical and emotional symptoms.

People with burn scars experience sleep problems, body perception disorders and problems with sexual intimacy. Because of this, it is no surprise that the development of mood and anxiety disorders and post-traumatic stress syndrome (\*) has a high prevalence. (Nosanov et al., 2020)

Back in 1991, Choinière et al. wrote that 75% of patients had difficulties with work, 56% had sleep problems and 67% reported that pain controlled their social life.

Loskotova (2017) explained in her article why burns and post-traumatic stress syndrome often go together. Both problems evolve very quickly and intensely. According to the author, this can be explained from embryology: The skin, lungs, colon and central nervous system are developed from the same layer, the ectoderm.

Loskotova (2017) concluded after her years of research with 1008 patients that people with burns should be treated as soon as possible. In this regard, LI 4 Hegu, LI 11 Quchi, ST 36 Zusanli and LU 7 Lieque would be the key points. With faster healing and better outcomes, there would be less risk of developing post-traumatic stress and other symptoms.

This shows that it is very important to put maximum effort into rapid recovery from burns while at the same time monitoring psychosocial well-being. In which the latter is probably the most important.

*(\*) Post-traumatic stress disorder is a collection of emotional complaints that can arise after experiencing a major event. These complaints are characterized by re-experiencing the accident, avoidance behavior, irritability and functioning less well than before the accident.*

### 3. Burn injuries according to Western approach

#### 3.1. Burn

##### Severity of burn

How bad a burn is depends on the size, depth, location of the burn, age and additional injuries. (www.brandwondenzorg.nl)

##### Depth of a burn

The depth of a burn depends on several factors: the temperature, the time the heat source acts on the skin, the cause of the burn, the age of the victim and the location of the burn on the body.

Depending on the depth of the burn, there are different "degrees" and specific characteristics. (burncare.com)



From left to right: Image 1, 2, 3, 4, www.brandwondenzorg.nl

First-degree	Second-degree	Deep second-degree	Third-degree
No blister or wound, so the skin is not broken sometimes swollen	the epidermis is damaged down to the dermis	The dermis is more affected than in a superficial second-degree burn	both the epidermis and dermis are completely damaged down to the subcutaneous fatty tissue
red and/or pink	shiny red, pink	red/white	white, beige to dark brown
dry	wet blisters	wet blisters	dry, leathery
prickling to painful	very painful feels smooth	painful feels smooth	hardly painful feels stiff



### 3.2. Normal wound healing

When injured, the body starts trying to repair the defect as quickly as possible to prevent blood loss and infection. This process consists of several phases that succeed each other and also partially overlap.

- The inflammatory phase,
- the proliferation phase,
- the remodeling phase.

#### 3.2.1. Inflammatory phase

It begins immediately after the injury and lasts for several hours. It is the phase of hemostasis and inflammation. Blood vessels contract and a blood clot is formed. Platelets play an important role in this process.

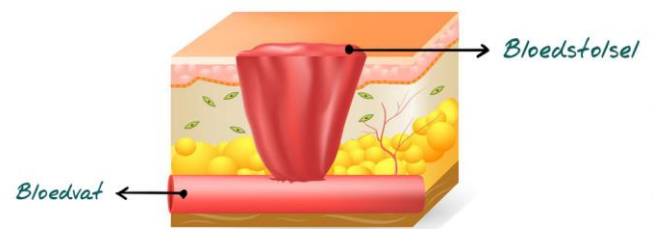


Figure 5, [www.startwondverzorging.nl](http://www.startwondverzorging.nl)

After blood clotting, the vessels locally dilate again. Various inflammatory cells (such as neutrophils, macrophages and lymphocytes) are drawn to the wound. These cells cleanse the wound by phagocytosis of invading microorganisms and the damaged tissue.

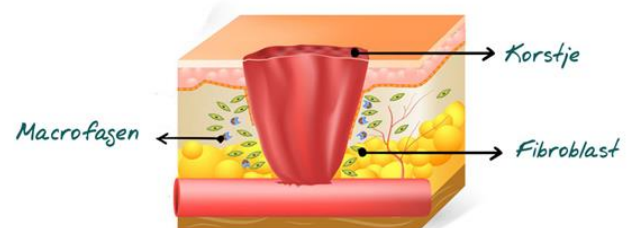


Figure 6, [www.startwondverzorging.nl](http://www.startwondverzorging.nl)

#### 3.2.2. Proliferation Phase

The inflammatory cells secrete signals that attract fibroblasts and endothelial cells to the wound, which together form the granulation tissue. During this phase, keratinocytes migrate across the granulation tissue to form a new epidermis to close the skin.

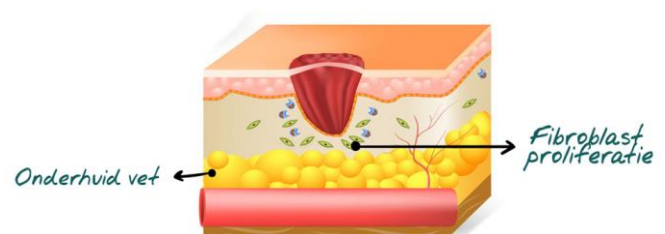


Figure 7, [www.startwondverzorging.nl](http://www.startwondverzorging.nl)

Fibroblasts and endothelial cells are the main cells involved in dermis repair. These cells have a number of functions, including promoting capillary growth (endothelial cells) and the production of collagen and granulation tissue (fibroblasts) in the wound area.

### 3.2.3. Remodeling phase

In this final stage, the damaged skin is replaced by new tissue. Through connective tissue reorganization, wound contraction (myofibroblasts) and epithelialization, the wound grows closed. Excess capillaries are broken down again. This phase can take up to 2 years, depending on the size of the wound.

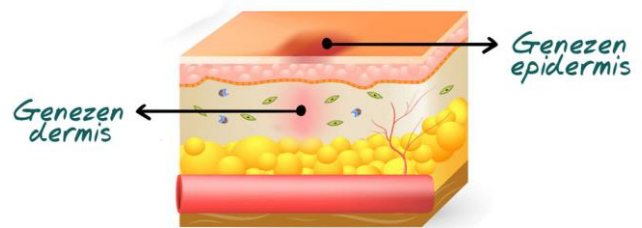


Figure 8, [www.startwondverzorging.nl](http://www.startwondverzorging.nl)

### 3.3. Scarring

To analyze the process of scar formation, studies have been done that demonstrate and attempt to explain the difference between in vitro and in vivo wound healing. Indeed, in in vitro wound healing, the fetal skin is able to heal completely and there is no scar formation. Furthermore, studies have been conducted that implant fetal tissue into adult skin, but where scars still form.

Fetal tissue contains several elements that allow the wound to close faster and remain flexible. The relationships between those elements in adult skin are very different, causing wound healing to be slower and scar tissue to form. (Téot et al, 2020)

The mechanism of scar formation is still not fully understood. It is generally believed that inflammation causes fibroblasts and myofibroblasts to multiply and produce a large amount of collagen and matrix, which in turn causes collagen metabolism and abnormalities in the arrangement. This causes local eruption, pain, itching and functional limitations. (Aliu & Aust, 2020, Liu et al., 2020 and Bintoro, 2022)

The exact role of inflammatory cells in scar formation is also not yet fully elucidated, but it is clear that they cause a derailed and delayed wound healing process.

People with burn scars often suffer from:

- pain
- color difference: red, purple, black discoloration, subject to temperature variations
- hard textures in the scar
- Deafness due to (permanent) neurological damage
- burning and/or itching sensation
- local pigmentation problems
- movement restrictions
- emotional or psychological problems



Factors that play a role in the degree of scarring are:

- the depth of the wound
- the length of the ignition phase
- the speed at which the wound closes
- the presence of mechanical forces in the wound
- persistence of the myofibroblast in the wound
- the location of the wound on the body
- the genetic characteristics of the patient  
(Téot et al, 2020)



Figure 9 and 10  
[www.howtotreatscars.com](http://www.howtotreatscars.com)

With an altered healing process of the skin, abnormal scars develop with different characteristics. They are classified into 3 groups:

- Hypertrophic scars (HTL) (Fig. 11) : scar tissue raised at least 1 mm above skin level but not beyond the limits of the original wound. Often improvement occurs after two years. It is unclear whether an increase or decrease in density of nerve fibers is present in HTL. (Téot et al., 2020)
- Keloid scars (KL) (Fig. 12): scar tissue that extends beyond the boundaries of the original wound, also affecting healthy skin. These scars do not improve. An increased density of nerve fibers has been shown to be present in keloid scars. (Téot et al., 2020)
- Atrophic scars (ATL) (Fig. 13): scar tissue in which there is a depression in the skin. (Téot et al., 2020)



from left to right: Image 11, 12, 13  
www.howtotreatscars.com

#### 3.4. Causes of scar pain

There are several theories surrounding the pathophysiology of scar pain.

One is that a neuroma results from neurons encapsulated by fibrous tissue during wound healing. A neuroma is an adhesion between the skin and fascia that causes the blood supply around the scar to be interrupted.

Another theory is that there is an imbalance between peptidergic and nonpeptidergic fibers, where the increased density of peptidergic fibers causes pain transmission to be facilitated.

The last theory also mentions vascular occlusion of the vasa nervorum, which prevents the small vessels from supplying the nerve with blood. (Nosanov et al., 2020 and Bintoro, 2022)

The fact that there is pain at rest suggests that scarring affects deeper nerve structures. With movement or manipulation of the scar, the pain worsens because of the limited nerve mobility associated with scar tissue.

The visible external scar is only the proverbial tip of the iceberg, as scar tissue extends under the skin and crosses tissue surfaces, causing nerve damage or entrapment. (Abd-Elsayed, 2022 and Bintoro et al., 2022)

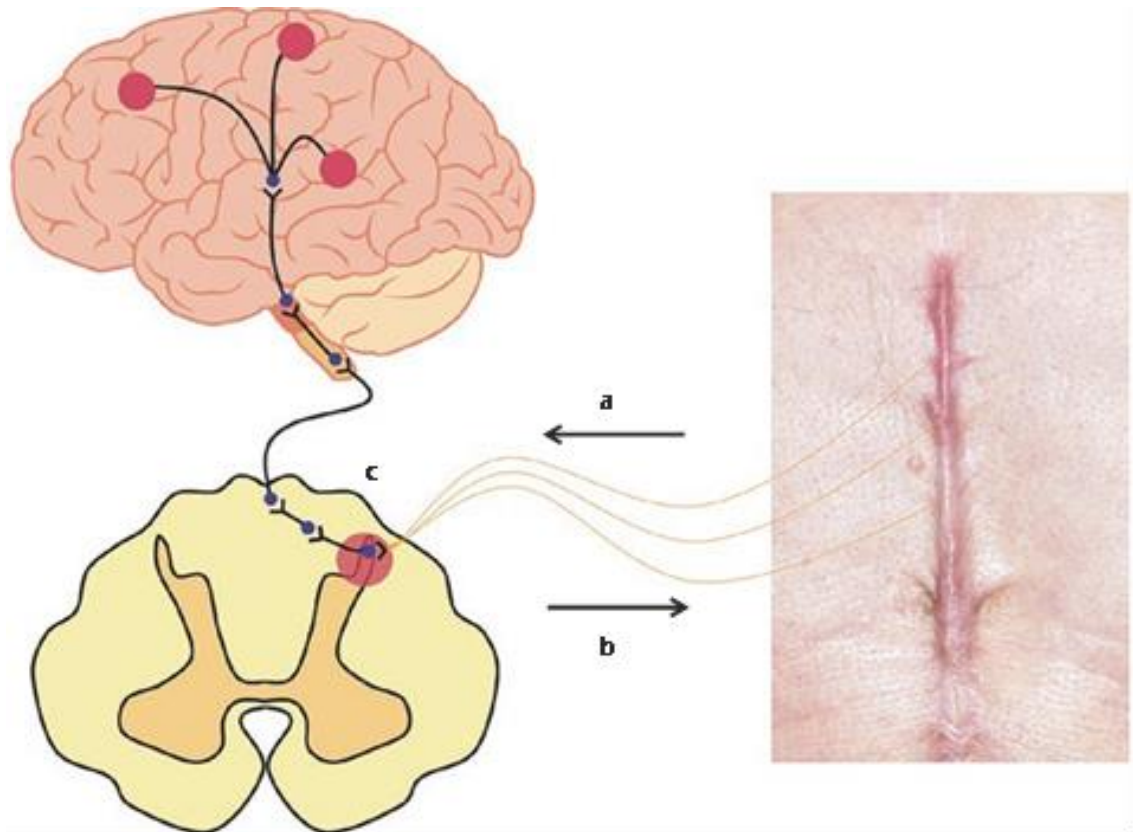


Figure 14, T  t et al. (2020)

Mechanosensitive nociceptors shape somatic sensations and tissue responses to mechanical forces. Tissues such as the skin respond to external mechanical forces such as stress through these nociceptors, whose neuronal cell bodies are located in the dorsal root ganglia in the spinal cord **c**. When a mechanical force is applied to a scar, the nociceptors in and around the scar convert these stimuli into signals to the dorsal root ganglia and then to the brain **a**. This produces the somatic sensations, for example, pain and/or itching. At the same time, signals return from the ganglia to the nociceptors **b**. This causes them to release neuropeptides from their peripheral terminals. Because these terminals often have physical contact with cells in the scar, the neuropeptides can cause neurogenic inflammation, promoting pathological scar formation and progression.

### 3.5. Causes of itching

T  t et al (2020) describes that itching can be classified into four groups:

- pruritogenic: arising in the skin from injury/inflammation
- neuropathic: arising from the afferent neurological pathway
- neurogenic: origin in the central nervous system in the absence of neurological pathology
- psychogenic: associated with psychiatric disorders



Although a number of "non-skin related itching" disorders seem to fit perfectly into one of the above groups, scar-related itching is believed to have a number of non-pruritogenic causes.

Itching follows neurologically the same pathway as pain. Yet itching, as a cause of limitations in daily life, is still understudied and often remains unresolved. (Téot et al, 2020)

Researchers at the Beverwijk Burn Center concluded from their study (Van Loey et al., 2022) that burn severity and post-traumatic stress symptoms play a role in the co-occurrence of itching and neuropathic pain.

In the study, 192 burn patients reported itching and neuropathic pain. Of them, 54% had neuropathic pain after discharge. Eighteen months later, this was still 24%. Complaints of itching were greatest in the group with chronic itching and pain. They also had more severe burns and more complaints of post-traumatic stress.

The role of posttraumatic stress symptoms may indicate altered central processing. The findings further suggest that, in burn scars, biological and psychodermatological processes underlie both chronic neuropathic pain and itch processes.

### 3.6. Prevalence scar pain and itching

Spronk et al. (2020) examined the long-term effects of burns between March 2017 and March 2018. The questionnaires revealed that nearly half of the participants (48.2%) experienced moderate to severe itching and 26.3% experienced moderate to severe pain (Figure 1).

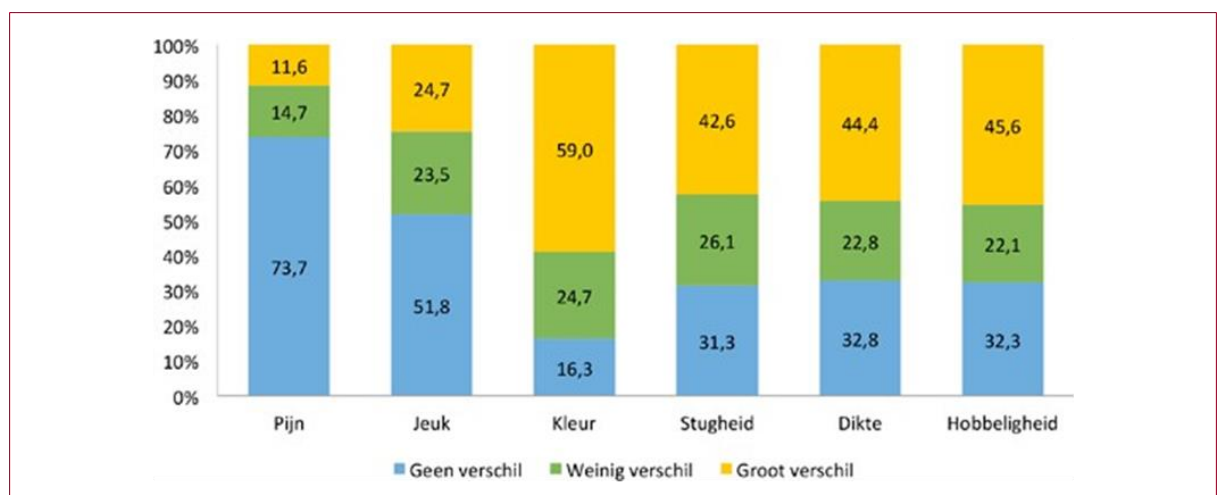


Figure 1. Results six characteristics of the POSAS (Spronk et al., 2020)

Dalebout et al. (2019) also found quasi similar figures in their study, "The most frequently reported problems are pain/discomfort (38.7%) and anxiety/depression (31.0%)." (Figure 2)

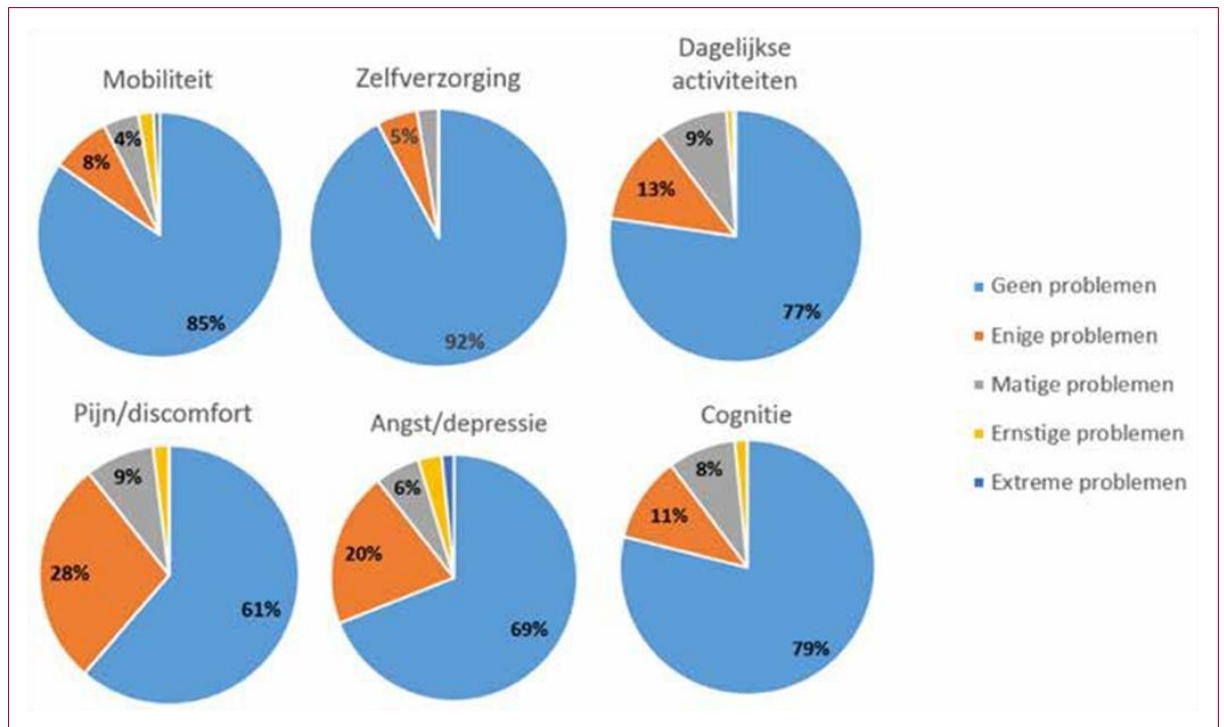


Figure 2. Results of the six different domains  
Percentages < 4% are not shown as numbers in the figure  
(Dalebout et al., 2019)

The Textbook on scar management by Téot et al. (2020) cites the same figures:

- 35% scar pain 1 or more years after injury
- 25% pain and 20% shooting pain, 30 years after injury

First signs of pain occur on average at 4.3 months after injury. At first the pain symptoms are described as "pins and needles," then they are called stabbing or burning and evolve into shooting pains.

The height of these figures leads one to conclude that proper studies on adequate treatments for pain and itching would be very urgent and virtuous for many patients. (Téot et al, 2020)

### 3.7. Treatment

The website of Oscare, the aftercare center for burns in Antwerp, lists how burn patients can be followed up after the recovery period in the hospital. A variety of treatments are suggested to provide the widest possible care for residual injuries and reduce residual symptoms.

#### 1. Self-care:

- Moisturizing creams
- Pressure Therapy
- Silicone therapy (Fig. 15)
- Topical ointments
- Medical camouflage and makeup
- Scarfit for kids



#### 2. Non-invasive treatments:

- Physical therapy and scar treatment:
  - mobilization
  - kineplasty
  - vacuum therapy (Fig. 16)



#### 3. Minimally invasive treatments:

- Corticosteroid therapy
- Injectable products
- Micro-needling (Fig. 17)
- Microdermabrasion and oxygen therapy
- Laser Therapy



#### 4. Surgery:

- Surgical scar revision (Fig. 18)
- Surgical wound closure techniques
- Hair stem cell transplant



Images 15, 16, 17 and 18, [www.howtotreatscars.com](http://www.howtotreatscars.com)

In April 2022, Abd-Elsayed et al. published a review related to the diagnosis, treatment and management of painful scars. They called it notable that conservative pharmacotherapy continues to be used initially, although there is little evidence of effectiveness. Similarly, subsequent therapies such as injections with a variety of pharmaceutical agents, neuromodulation techniques, and lastly surgical interventions all proved inconclusive from their study. In conclusion, they indicate that there is still no conclusive therapy for scar pain and more research is needed.



#### 4. Burns according to Traditional Chinese Medicine: history

In the historical review by Wang et al. (2003) on ancient Traditional Chinese Medicine related to treatment of burns, it is described that burns were then classified as "external diseases."

The oldest Chinese scientific description of the treatment of burns dates back to the 300s AD, which describes the external application of two different herbal applications. Burns were treated only symptomatically and not yet seen or understood as a disease.

Around 650 AD, Sun Si Miao (Fig. 19) was the first to describe the theory and differentiation of syndromes after burns. His prescription to treat burns was the first to combine internal and external applications.

In 752 AD, a new milestone in TCM literature was reached: the inspection of the tongue, indicated by Wang Tao (Fig. 20) as the most important parameter in burns.

Wang Tao describes that during the shock state, immediately after the initial injury, fire and toxic heat are strongly present in the body, resulting in the depletion of body fluids. Ying and qi are consumed, which in turn becomes signs of

Figure 19,  
weakness of qi and blood gives.



Wang et al. (2003)



Figure 20, Wang et al. (2003)

According to Wang Tao, the appearance of the tongue body is more important than the tongue body.

Several hours after the injury, the tongue body is pale red. Sometimes a redder tongue tip is present or spines are seen on the tongue. The mash is dry, thin and white.

After the restoration of blood volume and body fluids, the tongue body changes from dry to moist. In case of excessive fluids, the tongue is swollen, moist and has a light color. If the patient is in severe condition (yin and qi are depleted), the tongue root is stiff and there is a black, dry tongue.

The observation of whether the tongue is dry or wet is more important than the color during this period, according to Wang Tao, because the former changes faster than the latter.

Finally, in his book, Tao describes the recovery period. While the vital qi recovers, there is still toxic heat in the body. During this period, the patient exhibits a swollen tongue with teeth marks and a slightly red tongue. The tongue coating can vary from thin, white to yellow. Sometimes there are holes in the tongue mash or no mash at all.

He also discusses the local application of Chinese herbs to form a dry crust on the wound surface.

In 1665, Qi Kun publishes a book in which he cites that the most important point to find out is whether or not heat has entered the body.

If heat reaches the body surface, it will lead to skin and tissue necrosis. If there is a slight injury, only the skin is affected and not the internal tissues, but if the injury is more severe, the body will be harmed. Heat toxic materials attack the organs and viscera and cause an imbalance between yin and yang.

Several symptoms are possible:

- If toxicity from fire or yin damage leads to fever and yin fluid deficiency, the patient is thirsty and wants to drink cold.
- If heat attacks the heart, the patient will be unconscious or in delirium. Combined with pulmonary dysfunction and mucus production, one can speak of phlegm disrupting the heart.
- When heat enters the middle warmer and damages the stomach, the spleen qi is affected, resulting in the patient not wanting to eat.
- If damp-heat penetrates the small intestine, there is often frequent and foul-smelling bowel movements. If there is no stink at a later stage of injury, then spleen and stomach are affected. Heat toxins attack the internal and damage yin resulting in black and liquid bowel movements.
- When heat accumulates and becomes wind or fire, it enters the liver and the patient will then develop tremors, get a red tongue, high fever, thirst or fall unconscious and convulsions.
- With severe fluid loss (due to the three-wheeler being damaged by the fire attack), oliguria develops. With severe heat reaching the bladder or when heat reaches the kidney, renal qi will fail and result in anuria. In rare cases, in addition to yang and kidney hurting, heat will also affect yin. This results in weakness of kidney yang and diuria.
- Burn patients develop edema because heat damages the skin and hair, resulting in pulmonary-qi stasis and three-warmer-qi obstruction. If edema disappears and reappears, it is due to spleen and kidney weakness or intestinal qi-stasis.
- The reason for constipation during the later period of burns, is that yin fluids are depleted.

Qi Kun also described the method of diagnosis by using symptoms that he divided into "mild" and "severe."

- Mild: sore, red and wet skin, blistering, and red discoloration.

- Severe: large burn, immediate blistering, black-red or gray-white discoloration and muscle and internal tissue damage, all resulting in scarring or non-healing.

Clinical symptoms and therapeutic acupuncture points in TCM according to Qi Kun from the historical review by Wang et al. (2003)

Symptom	Acupuncture points ("Xue wei").
Anuria	CV 9 Shuifen, CV 3 Zhongji, CV 4 Guanyuan, BL 23 Shenshu, BL 28 Pangguangshu, SP 6 Sanyinjiao, GB 34 Yanglingquan, KI 3 Taixi, ST 28 Shuidao
"Coma"	GV 26 Renzhong, GV 20 Baihui, PC 8 Laogong, PC 9 Zhongchong, CV 12 Zhongwan, PC 6 Neiguan, ST 36 Zusanli, LI 4 Hegu
Depletion	GV 20 Baihui, CV 4 Guanyuan, ST 36 Zusanli, CV 12 Zhongwan, CV 6 Qihai

In the book Traditional Chinese Treatment for Surgical Diseases (Chun'e & Jinglun, 1996 , Chapter 31, p. 182), burns are still classified under "external diseases" and described as follows:

*"Disease is caused as soon as harmful fire and heat attack the body. In mild cases, damage of limited extent and depth is inflicted on the skin, upon which erythema, blisters and erosion appear, while in severe cases, large and deep damage occurs to the muscles, yin fluids in the body and even the zang fu organs, leading to in-coordination between zang and fu, imbalance between yin and yang and many other syndromes."*

#### 4.1. External treatment

Bandaging was mainly used to protect the surface of the wound, especially on the legs or small areas.

A gauze cloth containing various herbs was placed on the wound and covered with cotton. In a non-infected wound, no deeper than a superficial second-degree burn, the bandages were not changed.

For larger and deep burns, exposure therapy was used: here the patient was placed in an isolation room, without bandages, to allow the wound to dry faster and obtain crusting. Chinese herbs were used that prevented exudation, were analgesic, anti-inflammatory and astringent.

(Chun'e & Jinglun, 1996)

#### 4.2. Internal treatment

Minor burns were generally cared for externally only.

For larger or deeper burns, internal Chinese herbs were used to treat the depleted yin and affected yang. This internal treatment (fluid administration, antibiotics, pain relief, dietetics and wound care) had to be very well tailored to the different stages of the burns and symptomatology.

(Chun'e & Jinglun, 1996)

#### 4.3. Early stage

##### Signs and symptoms:

- Large amount of body fluids exit the body during the first two days after injury.
- In mild cases: fever and thirst occur, with a desire to drink.
- In severe cases: irritability, weak breathing, being in a trance, pallor, very cold limbs, burning urine, difficulty urinating, low blood pressure, deep red tongue, pulse that cannot be felt or deep.

##### Therapeutic principle:

Feeding yin, clearing heat, replenishing yang and avoiding collapses.

(Chun'e & Jinglun, 1996)

#### 4.4. Middle stage

##### Signs and symptoms:

- 3-7 days after injury (large area), the exudate begins to be reabsorbed. Because the internal organs are attacked by the excess fire, a high fever will occur, along with restlessness, thirst, irritability, dry mouth and lips, constipation, burning and dark urine, red or deep red tongue with yellow or rough yellow flesh and a tight rapid pulse.
- Heart: irritation, coma or delirium: the excess fire has entered the heart.
- Lung: dyspnea with nostrils open, cough and rales in throat.
- Kidney: enuresis and edema or hematuria.
- Liver: convulsions.
- Spleen: distention abdomen, constipation or frequent sticky bowel movements, loose bowel movements, vomiting and bloody bowel movements.

##### Therapeutic principle:

Clearing heat, expelling toxins, cooling yin and blood.

(Chun'e & Jinglun, 1996)

#### 4.5. Final stage

##### Signs and symptoms:

Qi and blood deficiency and spleen and stomach deficiency occur after the toxic fire and heat are cooled.

This is characterized by emaciation, pallor, lethargy, weakness, mouth and tongue erosion, dry mouth with little saliva, anorexia, distention, difficult skin formation at the level of the burn, pale red or pale swollen tongue with white or thin yellow batter and stringy weak or rapid pulse.

Therapeutic principle: stimulate qi and blood, nourish yin and replenish stomach.

##### Remove scabs and skin grafts:

2-7 days after the injury, if there is no infection and the injury involves 10-20%, the scabs are removed, followed by placement of skin grafts. For burns on the hand, this is done as early as 48h to ensure hand function and avoid scar contracture.

(Chun'e & Jinglun, 1996)

## 5. Burns according to Traditional Chinese Medicine: present day

### 5.1. Scarring

When an injury occurs, qi and blood stagnation is caused leading to abnormal skin sensations (numbness and/or itching) and pain.

If the qi and blood stagnation lasts longer, local qi and blood flow is blocked. This can lead to deficiencies. (Fang, 2014 and Lemaistre, 2022 )

General pattern differentiations in scarring are:

- qi and blood stagnation
- heat toxins and blood stagnation
- qi deficiency and blood stagnation

In TCM, hypertrophic and keloid scars are called Ban Heng Ge Da (hard scars) or Rou Gui Chuang (turtle type scars).

Hypertrophic scars are due to a deficiency of qi after skin trauma and a stagnation of toxicity on the surface of the skin, gradually causing phlegm and stasis.

The patient's constitution is very important here. Some TCM experts relate the occurrence of hypertrophy to already long-term damp formation in the body or damp in the lungs and stomach.

When damp is combined with skin trauma and blood stagnation, it increases the risk of keloid formation. (Liu et al., 2020)

### 5.2. Scar pain

The pain of burn scars is described as "pins and needles" (paresthesia) in the early stages, then it is called stabbing or burning, and then it evolves into shooting pains.

Within the TCM, we explain these complaints according to different pattern differentiations:

Paresthesia	Burning pain	Shooting pain
<ul style="list-style-type: none"> <li>• wind,</li> <li>• damp (heat),</li> <li>• blood-empty,</li> <li>• yin deficiency</li> </ul>	<ul style="list-style-type: none"> <li>• heat,</li> <li>• damp-heat</li> </ul>	<ul style="list-style-type: none"> <li>• blood-stasis</li> </ul>

(Maciocia, 2015)

There are two mechanisms by which yin deficiency can cause numbness and paresthesia:

- The failure of yin to nourish the tissues;
- the failure of yin to subdue the yang, leading to internal wind.

Yin and blood share the role of nourishing, moisturizing and maintaining the elasticity of skin. Weak yin can lead to dehydration and thinning of skin, with loss of sensitivity.

When numbness or paresthesia is the main complaint, the external pathogenic factor (EPF) is usually located in the superficial tissues.

As the EPF penetrates deeper into the meridian system, the blockage becomes more intense, qi and blood stagnation develops, and pain and weakness occur.

Furthermore, the timing of pain and response to heat and cold also have an important influence toward pattern differentiation and treatment.

### 5.3. Pruritus

Pruritus or itching is characteristic of burns and can occur both locally and generalized.

Maciocia (2015), in his book "Diagnostics in Chinese Medicine," named the three main causes of itching: wind, moisture and/or heat.

The skin is related to the lung, to the state of the blood and consequently to the liver. Many skin ailments are due to heat or blood stasis. Stomach heat can also cause blood heat and thus give rise to itching.

- Itching caused by wind, is very intense and occurs in different parts of the body, where, typical of this pathogenic factor, it jumps from one place to another, or is present throughout the body.
- Itching caused by damp is more localized and usually occurs only in areas such as armpit, genitals, hands and feet.
- Toxic heat-induced itching is very intense and is often accompanied by occurrence of furuncles or ulcerations secreting pus and blood.
- Blood emptiness also causes itching, but it is less intense than the three pathogenic factors. In this case, the skin is dry and scaly, and itching is worse at night. Liver-blood-emptiness is often at the root of wind in the skin.

Pattern differentiation in itching due to burns:

- Blood deficiency:
  - Blood loss from skin lesions and/or surgery.
  - Body fluids dry out due to heat invasion.
- Blood-Heat:
  - Emotional disturbances after (severe) burns.
- Wind Heat:
  - Burns cause large regions that are not contiguous, through which wind-heat can enter.

- Wind-cold:
  - A pre-existing yang deficiency allows the wind-cold to remain in the skin.
  
- Wind-damp:
  - By an already present constitution of damp and an attack of wind.

#### 5.4. Treatments

In today's westernized acupuncture treatments, focusing on burns, the use of internal herbs has taken a back seat and it is mainly the external approach that is employed.

The treatments found in the literature are very diverse. The listing on the following pages is a synthesis of all points from articles and books.

The chronology begins with (sub)acute burn care, where LU 7 Lieque, LI 4 Hegu and LI 11 Quchi and ST 36 Zusanli are the four points deployed.

After hospitalization, residual symptoms are around the corner, patients end up in secondary or primary care, and treatments can be used that will work on these symptoms. Here there is difficulty finding consensus in the literature.

Purely hypothetically, a patient with persistent scar pain and/or itching could be started with major major points as Harald van der Biest describes in his Dermatology course (2018) via the pattern differentiations.

If this did not give sufficient results, additional work could be done locally with the surround the dragon technique and needle rotations.

Analysis and treatment according to the bi-syndrome is also a possibility.

If none of this brings improvement, deeper digging could be done to find the trauma that has become fixed somewhere in the body through the complementary meridians. Then treatment could be initiated through the system of sinews and divergent meridians, as Yvonne Farrell describes.



#### 5.4.1. (Sub)Acute burn care

According to Loskotova (2017), a first brief note related to the use of acupuncture in burns was prepared by Lebarbier in 1975. LU 7 Lieque was then mentioned in acute burn care. Later, in 1980, a small group of burn wound patients were treated with acupuncture by Karel Prusik in Czechoslovakia and this found faster and better wound healing. No specification of treatment duration and frequency was mentioned.

In 1983, Loskotova began her own empirical research in acute burn care.

In the acute phase, large points such as LI 4 Hegu, LI 11 Quchi, ST 36 Zusanli and LU 7 Lieque were mainly used to stimulate wound healing. (Loskotova & Loskotova, 2017 and Chin et al., 2020)

Rozenfeld (2020) described in his review that acupuncture can provide

- reducing inflammation
- stimulating epithelial cell growth
- shortening of wound healing
- reducing scarring

Various effects were also described in acupuncture treatments of mature scars, such as

- an increase in collagen and elastin
- an increase in tissue thickness
- the improvement of oxygen supply
- a normalization of pH

Multiple points were used in the literature:

- LI 4 Hegu and ST 44 Neiting: analgesic
- GV 20 Baihui and HT 7 Shenmen: calming
- GB 34 Yanglingquan: analgesic and improve motor dysfunction
- LI 4 Hegu and LR3 Taichong: combination to move qi and blood
- LI 11 Quchi and ST 36 Zusanli: improve immunity and homeostasis
- ST 36 Zusanli: stimulating fibroblasts and macrophages (Li et al., 2021)
- Ashi points: stimulating healing process
- SP 4 Gongsun and PC 6 Neiguan: opening and connecting point of the chongmai
- BL 17 Geshu: backshup point of the blood
- SP 10 Xuehai: resolving blood stagnation
- SP 9 Yinlingquan and ST 40 Fenglong: damp and phlegm transforming
- Huatuojiayi points: for pain and heat in dermatomes (Avijgan, 2017)
- ancient shu points: luo-connecting for blood stagnation, shu-stream for damp, ying-spring for heat

### 5.4.2. Pain

(from Maciocia (2015) and Deadman (2023))

#### **Treatment principles:**

- move qi and blood
- solve stagnation
- transform damp
- dissipate wind
- cool heat
- nourish blood

#### **General points:**

- LI 4 Hegu
  - dissipates wind
  - together with LR 3: relieves pain and spasm
- ST 36 Zusanli
  - dissolves damp
  - tonifies qi
  - nourishes blood and yin
  - clears heat
  - revives yang
- LR 3 Taichong
  - diffuse liver qi
  - subdues liver yang and calms wind
  - nourishes liver blood and yin
  - together with LI 4: relieves pain and spasm

#### **Points per pattern differentiation:**

##### **1. Wind**

- LU 7 Lieque
  - dissipates wind and damp
  - opening point CV
- LI 4 Hegu
- LI 11 Quchi
  - skin problems due to blood heat or damp heat
  - clears heat in the body
  - cools the blood
  - dissipates wind and damp
  - regulates qi and blood
- TE 5 Waiguan
  - dissipates wind
- LR 3 Taichong

## 2. Heat

- LU 5 Chize
  - regulates water passages
  - relaxes the sinews
  - relieves pain
- LI 4 Hegu
- LI 11 Quchi
- TE 5 Waiguan
  - dissipates heat
- TE 6 Zhigou
  - regulates qi
  - clears heat
  - relieves pain
- LR 3 Taichong

## 3. Damp (heat)

- SP 3 Taibai
  - dissolves damp (heat)
- SP 6 Sanyinjiao
  - dissolves damp
  - enlivens blood
- SP 9 Yinlingquan
  - dissolves damp
  - opens and moves the water passages
- GB 34 Yanglingquan
  - promotes sinews and joints
  - relieves pain
- GB 39 Xuanzhong
  - promotes muscle diaphragms and bones
  - removes wind-damp
  - relieves pain
- LR 3 Taichong

## 4. Blood deficiency

- SP 3 Taibai
  - strengthens spleen and stomach
  - regulates qi
- SP 6 Sanyinjiao
  - strengthens spleen and stomach
  - harmonizes liver and tonifies kidneys
  - harmonizes lower warmer
  - enlivens blood
- BL 17 Geshu
  - enlivens blood
  - nourishes and harmonizes blood

- BL 18 Ganshu
  - regulates and nourishes liver blood
- GB 34 Yanglingquan
  - spreads liver qi
- GB 39 Xuanzhong
  - promotes bone health (hui-point marrow)
- LR 3 Taichong

#### 5. **Blood stasis**

- ST 36 Zusanli
- SP 6 Sanyinjiao
- SP 8 Dijī
  - xi-cleft point spleen
  - enlivens blood
  - harmonizes spleen
  - dissolves damp
  - moderates acute conditions
- SP 10 Xuehai
  - enlivens blood
  - dissolves stasis
- BL 17 Geshu
- BL 18 Ganshu
- KI 14 Siman
  - regulates qi
  - moves blood stasis
  - promotes the lower warmer
  - relieves pain
- GB 34 Yanglingquan
- GB 39 Xuanzhong
- LR 3 Taichong

#### 5.4.3. *Itch*

(from Maciocia (2015), Deadman et al. (2023) and Van der Biest (2018))

#### **Treatment principles:**

- stop itching
- cool blood and heat
- dispel wind and cold
- eliminate damp
- moisturize dryness
- nourish blood

**General points:**

- LI 4 Hegu
  - clears wind-heat
  - frees the surface
  - combined with LR 3 Taichong: eliminates wind and calms shen
- LI 11 Quchi
  - skin problems due to blood heat or damp heat
  - clears heat in the body
  - cools the blood
  - dissipates wind
  - dissolves damp
  - relieves itching
  - regulates qi and blood
- SP 6 Sanyinjiao
  - cools blood
  - removes damp
- SP 10 Xuehai
  - cools blood
  - improves the skin
- BL 17 Geshu
  - enlivens, harmonizes and nourishes blood
  - cools blood-heat
- Baichongwo (extra point)
  - cools blood
  - eliminates wind
  - removes damp

Needling technique: mostly reducing method

***According to D. Hartmann (Hartmann, 2009), the main itch points are:***

- LI 11 Quchi
- SP 10 Xuehai
- HT 7 Shenmen
  - clears fire
  - clears heat in the heart
  - region HT 4 Lingdao - HT 7 Shenmen: excess-type cardiac problems related to dermatology (Wang & Robertson, 2008).
- GB 31 Fengshi
  - eliminates wind
  - relieves itching throughout the body
- Baichongwo

**secondary:**

- BL 12 Fengmen
  - eliminates wind
- BL 16 Dushu
  - relieves itching throughout the body
- BL 17 Geshu
  - relieves itching throughout the body
- BL 18 Ganshu
  - cools fire
  - clears damp-heat
  - softens wind
- KI 2 Rangu
  - clears empty heat, genital itching
- LR 5 Ligou
  - clears damp and heat in the lower warmer

*All of these points treat itching/pruritus and are also effective for skin conditions in general.*

**Points per pattern differentiation:****1. Blood deficiency**

- ST 36 Zusanli
  - strengthens stomach and spleen
  - strengthens qi and nourishes blood and yin
- SP 6 Sanyinjiao
  - strengthens spleen and stomach
  - harmonizes liver and strengthens kidney
  - enlivens blood
- SP 10 Xuehai
- BL 12 Fengmen
- BL 17 Geshu
- BL 20 Pishu
  - strengthens spleen
- CV 4 Guanyuan
  - strengthens original qi and essence
  - strengthens and nourishes kidney
  - warms and strengthens spleen

If itching is severe:

- LI 11 Quchi
- GB 31 Fengshi

## 2. Blood-Heat

- LI 11 Quchi
- SP 10 Xuehai
- BL 17 Geshu
- BL40 Weizhong
  - cools blood
- LR 1 Dadun
  - regulates liver
  - soothes shen
- LR 2 Xingjian
  - clears liver-heat
  - spreads liver-qi
  - soothes liver-wind
  - clears heat
- LR 5 Ligou
- GV 14 Dazhui
  - clears heat
  - calms and dissipates wind
  - strengthens deficiency

Needling technique: reducing, possibly bleeding some points

Cupping can possibly be applied to the following points:

- BL 12 Fengmen
- BL 18 Ganshu
- GV 14 Dazhui

## 3. Wind Heat

- LI 11 Quchi
- SP 10 Xuehai
- BL12 Fengmen
- GV 14 Dazhui

If heat is intense, combine with points for blood heat.

## 4. Wind-damp

- LI 11 Quchi
- ST 36 Zusanli
- SP 5 Shangqiu
  - strengthens spleen
  - transforms damp
- SP 6 Sanyinjiao
- SP 9 Yinlingquan
  - regulates spleen
  - transforms damp
  - Opens water passages and makes them move
- BL 13 Feishu

If located in elbow crease: LU 5 Chize and PC 3 Quze

If in knee crease: BL 40 Weizhong and LR 8 Ququan

If in groin and around genitals: LR 5 Ligou

## 5. Wind-Cold

- SP 10 Xuehai
- BL 12 Fengmen
- BL 13 Feishu
  - releases the exterior
- TE 5 Waiguan
- GB 20 Fengchi
  - dissipates wind

(possibly also LI 11 Quchi: expel wind)

### 5.4.4. *Surrounding the dragon*

Scar tissue is seen in TCM as qi stagnation and blood stasis. It can also arise from phlegm damp accumulation along the course of the affected meridian or meridians. These accumulations can be local, near or distal and result from low qi and blood flow through the scar and through the meridians. (Lemaistre, 2022)

"Surrounding the dragon" (STD) is a term used to describe the needling technique through the scar. One uses rather long and thick needles inserted on the side of the scar with the aim of penetrating transversely through the scar. This accelerates the healing of the scar tissue, leading to faster recovery and better flow of qi and blood along the blocked meridians. (Hartmann D., 2009, p138)

In the Ling Shu, "The Yellow Emperor's Internal Classics" states: "The fifth technique is Yang Ci, 1 needle in the center and 4 needles around it. The needles are inserted superficially to treat a large area." (Huang-fu, 1994)

There is a scarcity of scientific articles describing this technique and almost no high-quality controlled studies providing evidence about its use. There are only a few articles describing the technique.

- Redfearn (1992) described the use of STD in a treatment that the author himself administered after abdominal surgery. The author states that this technique is good for treating areas of injury and soft tissue damage, and for hypostatic "varicose vein ulcers. He also tells of its use around a wasp sting; however, no references were used to support these claims.



- Hunter (2001) treated by STD a keloid scar after surgery with good results after six months. (Fig. 21)

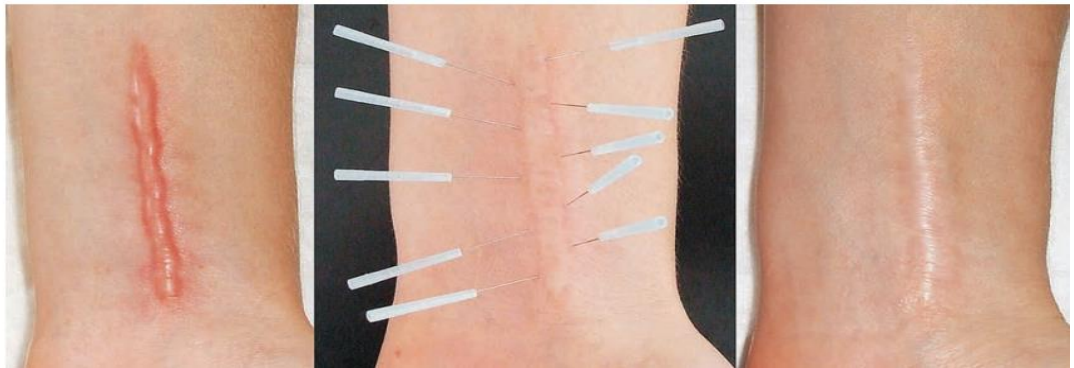


Image 21, Hunter (2001)

- The technique is also described by White et al. (2008) and, according to him, used for superficial skin lesions. STD would aim to increase blood flow, influence immunomodulation and inflammatory responses, which may be useful in lesions that heal slowly.
- Foell (2012) used STD on a gangrene wound with good results after 20 weeks.
- STD has also been used in the treatment of scar pain by Fang (2014). In this article, the technique is called "Wei Ci" and is said to be derived from the Yang Ci technique that the author says is described in the Yellow Emperor's Internal Classic. "The Yang Ci technique is good for dispersing superficial cold stagnation in a large area. The Wei Ci technique has a similar stagnation-lifting effect as the Yang Ci technique. It also harmonizes Ying and Wei," Fang said.
- In a review of studies on STD in patients with postherpetic neuralgia, Avijgan et al. (2017) found that it can be a useful technique, although all the articles involved were case studies and not randomized controlled trials.
- Rozenfeld et al. (2020) noted in his research that STD could be a good technique for scar pain and other symptoms related to scars. Wound healing would be facilitated and the process would be less painful. To better understand the underlying mechanisms, he suggested that more research should be done and he also drafted a protocol.
- Godley (2020) discussed two cases where the fifth metatarsal caused irritation. Again, good results were reported. He described that STD was used in superficial skin lesions to improve blood supply and immunity and regulate inflammation.
- Schuster (2021) used STD in his practice to relax and flatten scar tissue. (Fig. 22)

- Tuckey et al. (2022) described a case of a man who received autogenous skin grafting after burns on his flank. Because of the STD, he had a good result after 7 weeks. (Fig. 23)



Figure 22,  
Schuster (2021)



Figure 23,  
Tuckey (2022)

#### 5.4.5. Needle stimulation

One process that is important in the local effect of acupuncture is needle stimulation. This is applied to enhance deqi to stimulate vasodilation and improve blood flow.

Needle rotation, compared to other needling techniques, has the greatest distal effect both on superficial and deep receptors and on stretch receptors in the skin. Rotation also excites the C-fibers (in most cases), which other needling techniques do less frequently. (Fig. 22 and 23) (Zhang et al., 2012)

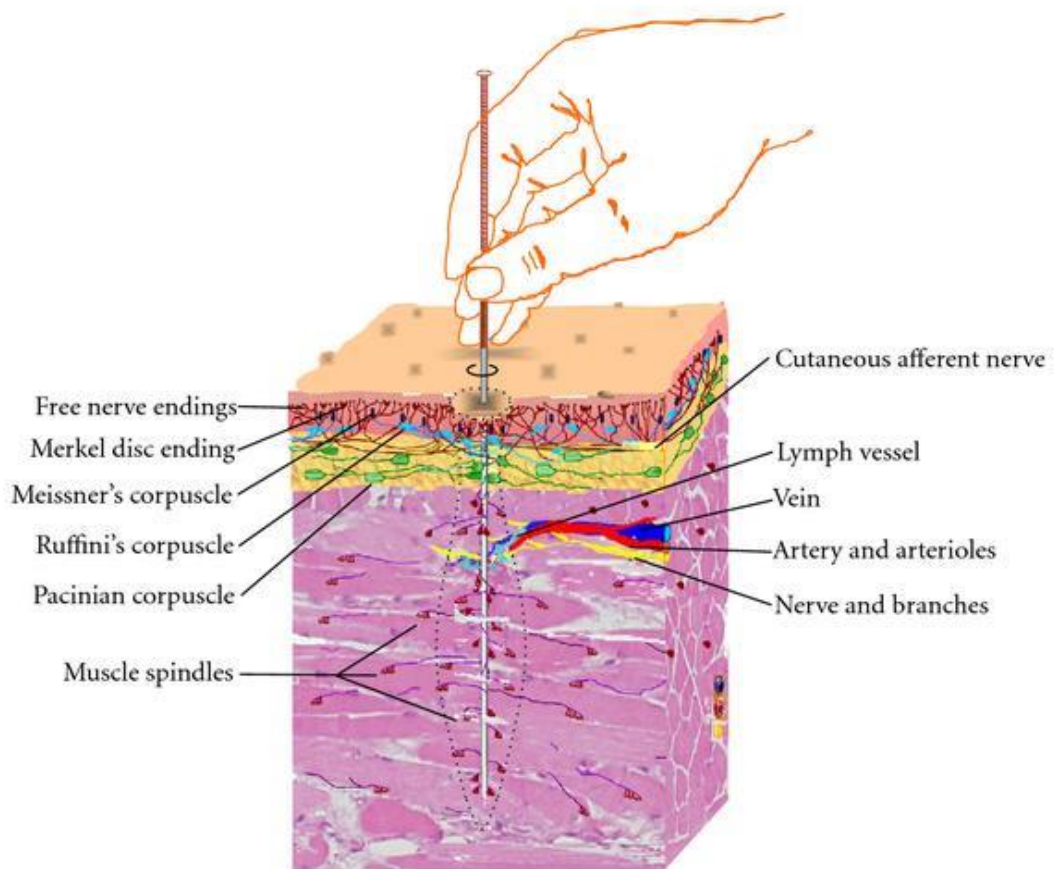


Figure 22,  
Zhang et al. (2012)

Needle rotation in an acupuncture point twists and breaks local fibrous tissues, causing cellular damage. As a result, damage-related factors are released. The different molecules increase information transfer to enhance the anti-inflammatory effect (Godley, 2020).

This effect is mediated by the activation of the vagus nerve and parasympathetic pathways, for example, in points such as ST 36 Zusanli and LI 11 Quchi. There is also a sympathetic response upon stimulation of ST 25 Tianshu (Li et al., 2021).

However, there is debate about how this occurs. It is possible that the sympathetic nervous system can be activated or deactivated, as it can also be affected by the presence of pain (Paulson & Shay, 2013).



Langevin et al. (2007) showed that needle rotation has an effect on fibroblast cell structure and hypothesized that it could be relevant to connective tissue tension and healing mechanisms. Needle rotation causes a general increase in chemical transmitters involved in reducing pain.

These biochemical reactions could have an effect in remodeling fibroblast cells, which in turn inhibit fibrosis in healing connective tissue.

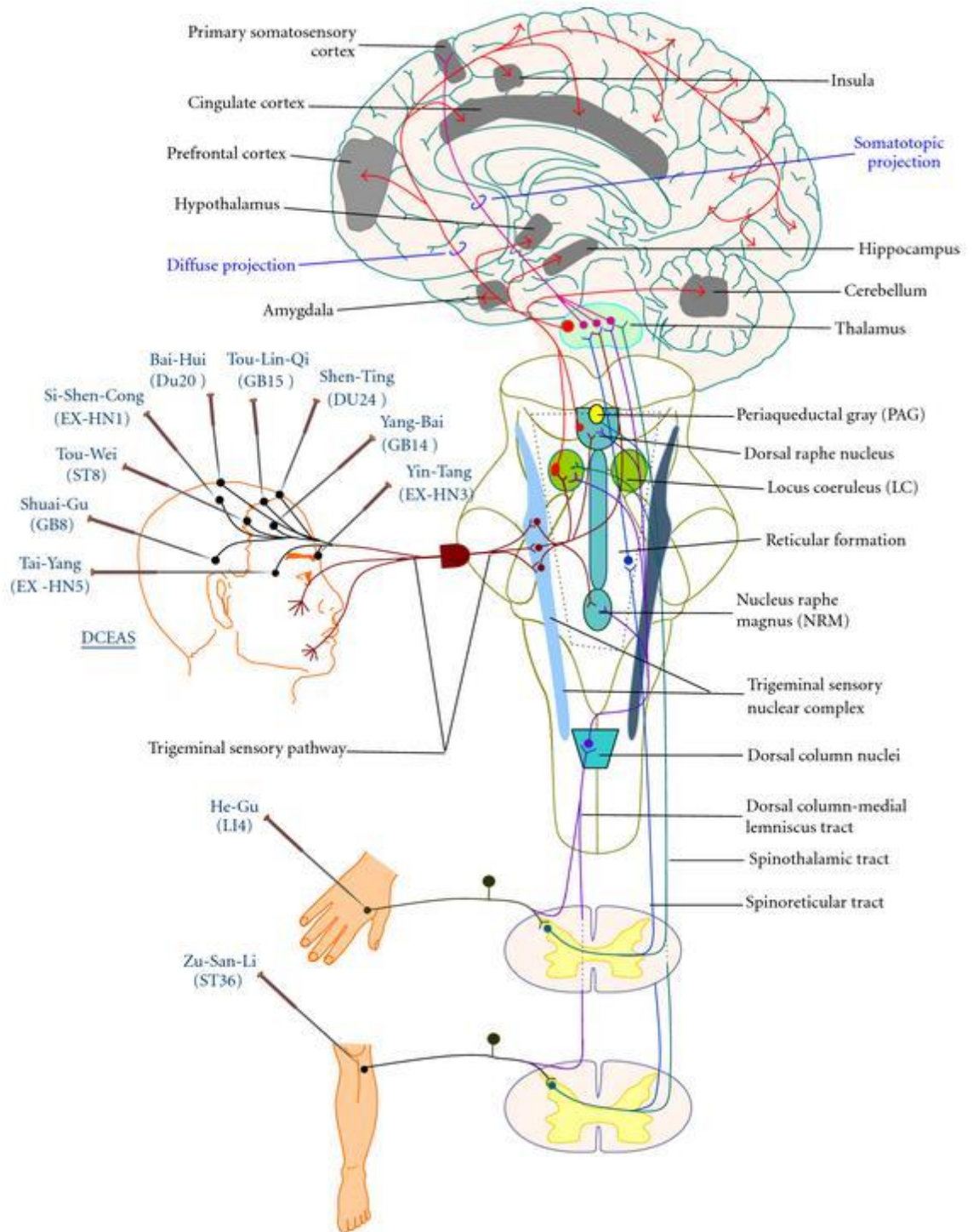


Figure 23, Zhang et al. (2012)

#### 5.4.6. Bi-syndrome

Prolonged qi and blood stagnation at the level of ying and wei after trauma can evolve into a bi-syndrome or chronic painful obstruction syndrome. The ying and wei cannot move smoothly through the scarred area to defend and nourish it. Thus, pain, itching, numbness or other abnormal sensations develop. (Fang, 2014, Chung & LaRiccia, 2016)

Palpation method for scars described by Chung & LaRiccia (2016):

Examine the scar surface with light palpation, look for soft spots: this is usually because the deeper tissue is deficient. Then examine the area around the scar. Finally, you can use a little more pressure on the painful regions and muscles or use stretch and/or movement to provoke the pain stimulus.

Scar treatment according to Chung & LaRiccia (2016):

- With (+) stimulation of the jing-well points, a wave of qi is created and to accelerate the qi flow, the tonification point is stimulated along with it.
  - In some meridians, the jing-well and the tonification point are the same. Here the yuan-source point is then used instead of the tonification point.
- To further facilitate flow, meeting points are stimulated.
- The painful areas where the qi is blocked are reduced (-).
- All points are stimulated bilaterally, except the tonification point (this only on the painful side). This creates an asymmetrical situation, which makes the stimulation more dynamic.

Meridian	Jing-well	Tonification	Yuan-source	Meeting
Long	LU 11	LU 9	LU 9	GB 22
Pericard	PC 9	PC 9	PC 7	GB 22
Heart	HT 9	HT 9	HT 7	GB 22
Spleen	SP 1	SP 2	SP 3	CV 3
Liver	LR 1	LR 8	LR 3	CV 3
Kidney	KI 1	KI 7	KI 3	CV 3
Large intestine	LI 1	LI 11	LI 4	GB 13
Three-Warmer	TE 1	TE 3	TE 4	GB 13
Small intestine	SI 1	SI 3	SI 4	GB 13
Stomach	ST 45	ST 41	ST 42	SI 18
Gallbladder	GB 44	GB 43	GB 40	SI 18
Bladder	BL 67	BL 67	BL 64	SI 18

Instead of SI 18 Quanliao, authors also use ST 7 Xiaguan, ST 3 Juliao, because they achieved good results with these empirically.

Instead of GB 13 Benshen, ST 8 Touwei is also named.

- The chongmai is the sea of blood. Stimulation of this meridian lifts blood stagnation in the body. This can be achieved by reducing right SP 4 Gongsun and left PC 6 Neiguan (this way for women, vice versa for men).
- BL 17 Geshu and SP 10 Xuehai are also reduced to reduce blood stagnation.

#### 5.5. Hypothesis: the use of muscular and divergent meridians

Scarring, pain, itching and sensory disturbances located in the course of sinews or divergent meridians... What if we project the theory of these meridians to residual injuries that hinder the daily life of burn patients?

Yvonne Farrell's December 2022 lecture on the divergent meridians and a nice conversation with her, gave me the idea to check her book and her wisdom against what I was learning so far about burns and the world of Chinese medicine.

What follows below is from her book (2021) and lectures and from Ann Cecil-Sterman's book "Illustrations of the complete acupuncture system" (2014).

#### At the physiological level

**Sinews** are usually used to treat orthopedic or dermatological problems. These cause typical symptoms such as itching or burning sensations in the superficial tissues.

Several causes underlie these problems:

- External factors such as wind, cold, damp, heat, drought and summer heat can get stuck in the muscle meridian and cause disease there.
- Physical trauma blocks the wei qi in the muscle meridian and causes swelling and loss of function, resulting in local stagnation of qi and blood. This usually leads to heat.
- Organ imbalances can lead to muscle contractions and cramps, reduced tissue nutrition, increased inflammation and ultimately atrophy or whey syndrome.

**Divergent meridians** are vessels that carry two types of qi: wei qi and yuan qi. In the dry physical sense, they can be used to strengthen the relationship between the functions of the yin and yang meridian.

### On spiritual energetic level

Yvonne Farrell (2021) translates the main task of the sinews and divergent meridians to a deeper level in her book "Acupuncture for Surviving Adversity, Acts of Self-Preservation. She devotes more than 80 pages to the sinews and the divergent meridians and their impact on the body and mind.

*Free the body, free the mind.*

~ Yvonne R. Farrell

To build a bridge between the theory I learned from Yvonne Farrell and burn pain and itching, I'll start at the beginning: the acupuncture system as seen through the Nei Jing.

The Nei Jing divides the entire acupuncture system of meridians and collaterals into five classes:

- the sinews,
- the main meridians,
- the luomeridians,
- the divergent meridians and
- the eight extraordinary meridians.

The main meridians take care of organ functions. The other meridians, with the exception of the eight extras, take care of our body by controlling the ingress and ejection of pathogenic factors. The eight extras take care of life to its full potential and absorb pathogenic factors at the yuan qi level.

There are three levels of qi and the corresponding different systems they flow into. Arranged from superficial to deep, we find:

- Wei qi: flows in the sinews. Wei qi is unconscious, reflexive, reactive.
- Ying qi: flows in the main meridians and the luomeridians. Ying qi handles the processing of our emotions and internal circulation of blood.
- Yuan qi: flows in the eight extraordinary meridians. They take care of our constitution, beliefs, curriculum, sense of self.

The divergent meridians have a special role because they contain two types of qi, namely wei qi and yuan qi. The divergent meridians restore the relationship between wei and yuan qi, they balance the world around us and the world within us, who we are.

The complementary meridians, being all but the main meridians, allow us to understand how the body deals with pathogenic factors at the time when the body cannot fully process the invasion. They are a model for understanding (and changing) personal evolution, including our personal emotional journey and its impact on our physiology.

The complementary meridians will keep the potentially life-threatening pathogenic factor away from the Zang Fu so that the organs are less directly threatened. For this purpose, latency or slower disease is created so as to protect life. (Cecil-Sterman, 2014)

When we experience trauma, especially one that leaves a visible scar, there will be a lot of emotion around it. The emotional process, according to the Nei Jing, is a ying qi function and thus a function of the luo system and the main meridians. We try to learn from the experience so that we do not carry the weight of it. To do this, we need to circulate ying qi in order to keep digesting the experience until we can create a context and learn something from it that allows us to move forward.

### 5.5.1. Hypothesis 1

#### **Sinews**

The sinews make every effort to avoid pain and suffering. Wei qi engages, in a reflex manner, the sinews and dermatomes to respond to as many stimuli as possible, assessing the input, determining the threat level and then reacting to protect our body.

If the input is overwhelming, the sinews will brace themselves. The more and the longer this happens, this preventive attitude will eventually lead to discomfort. This depletes resources, limits movement and ends up with chronic obstructed circulation. This causes problems in muscles and joints, neuralgias, skin conditions and circulation problems. Eventually this will lead to dysfunctions of the organs we actually wanted to protect.

Wei qi is brought to the surface through the lungs and dispersed. This endorses a strong connection between wei qi and Po, which resides in the lungs. Through inhalation, Po absorbs valuable information and under normal conditions, through exhalation, it releases what no longer serves us.

If the wei qi cannot let go of what no longer serves us, it will fix the pathological experience in the superficial tissues and sinews, such that they can be kept as far as possible from the vital organs for survival. Latency is created. The regions where the trauma or emotion is stored may show decreased sensation and voiding. Increased irritability or flinching at touch also occur.



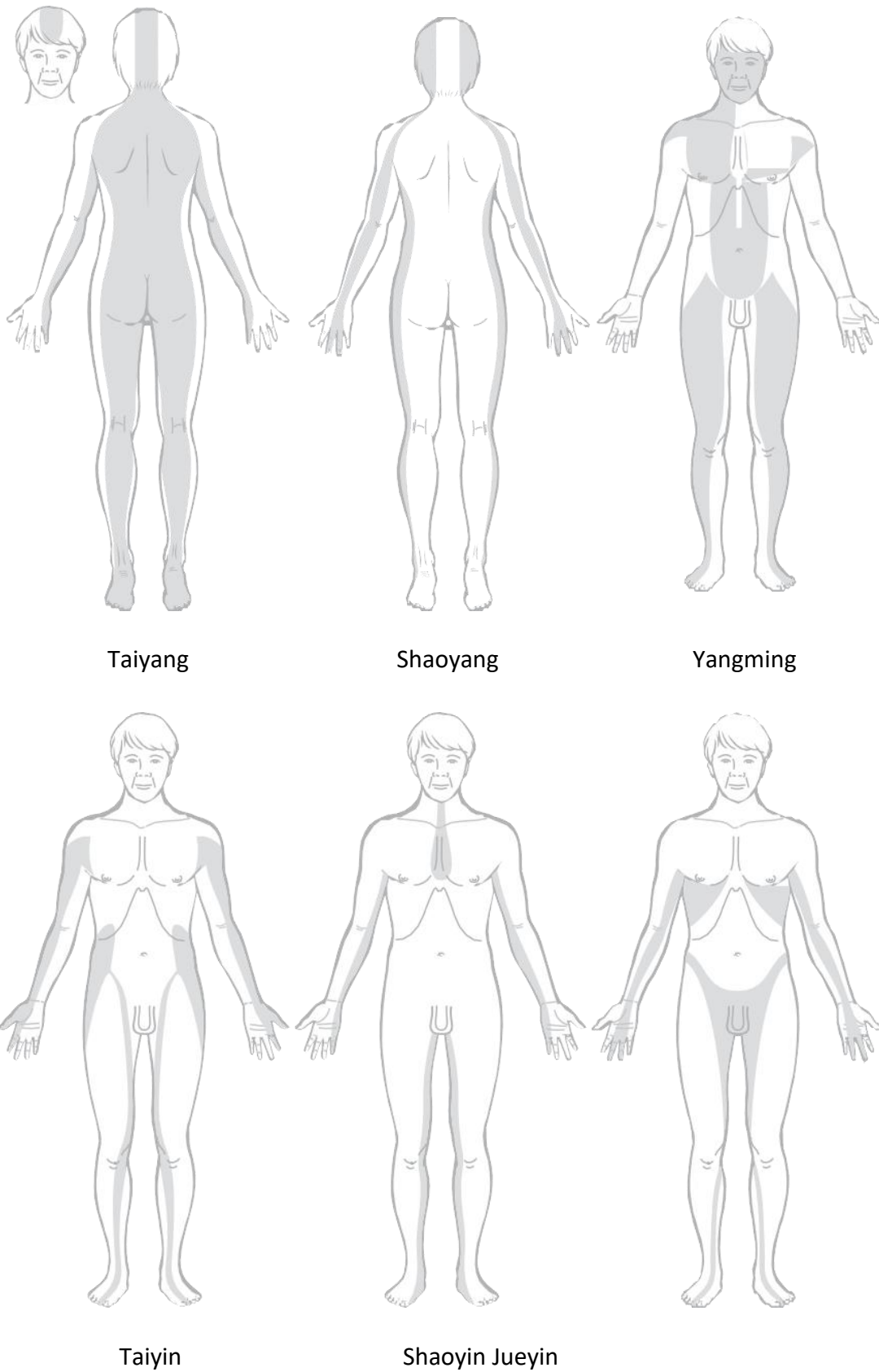


Figure 24, McCarthy (2003)

The bracing of wei qi can be easily seen by a practiced eye in a person's posture and movement. The six dermatome zones are used for this purpose.

- The taiyang zone (BL-SI) provides the upright posture and forward movement with the eyes looking straight ahead.
- The shaoyang zone (GB-TE) contains the rotational movement and peripheral vision that opens up. The head can be rotated to view all options. The course being taken can be changed.
- In the yangming zone (ST-LI) it is possible to slow down, to put the brake on. It is possible to be able to choose how and when to rest.
- In the taiyin zone (SP-LU), the world is uncomfortable and we retreat to our base.
- In the shaoyin zone (HT-KI), we no longer take anything and do not want to feel anything.
- In the jueyin zone (LR-PC), we see reactions in the face of fear and survival threats. This is the "freeze" or freezing. We retreat into a fetal position; we want to disappear.

Point selection to free the wei qi:

- jing-well point: when wind or change in sinews bring about
- meeting point: treat the affected muscle meridian and protect the two others of the same group
- xi-cleft point: in case of stagnation in the meridian
- shu-stream or jing-river point: at damp
- he-sea point: at cold, deficiency or damp

When projecting this theory onto burns, comparisons could be made with the burned skin areas and the dermatome areas. Patients who experience tingling, lividity, itching, pain and/or movement restriction could feel relief from their residual injuries with treatment through the sinews.

In accordance with the points described above, treatment can be initiated.

For example: a problem area located in the taiyang zone:

- |                      |                 |                |
|----------------------|-----------------|----------------|
| • jing-well point:   | BL 67           | SI 1           |
| • meeting point:     | SI 18           | GB 13          |
| • xi-cleft point:    | BL 63 Jinmen    | SI 6 Yanglao   |
| • shu-stream         | BL 65 Shugu     | SI 3 Houxi     |
| or jing-river point: | or BL 60 Kunlun | or SI 5 Yanggu |
| • he-seapoint:       | BL 40 Weizhong  | SI 8 Xiaohai   |

### 5.5.2. Hypothesis 2

#### Divergent meridians

*Harmony between wei and yuan qi is the daily negotiation between  
The need to survive and the desire to be.  
If we manage to maintain a dynamic balance,  
we can express ourselves in the world in a true and authentic way.  
~ Yvonne R. Farrell*

The divergent meridians are an extension of the main meridians and have the function of protecting life. In the divergent meridians we find the suppression of emotions that affect the self-image. When trauma has entered the divergent meridians, it means that the luo and main meridians have failed to process the emotions.

Burn patients are reminded every day of the trauma they have experienced. They have an unmistakable visible representation of this trauma, which is not only difficult to look at, but often restricts movement.

The pericardium cannot carry this overwhelming daily memory and this requires an action for our self-preservation that forces us to suppress the emotion(s) in order to continue.

Large scars, from injuries such as burns, block blood flow to the sinews to such an extent that movement is impeded and the patient is even forced into a different postural pattern or posture. This forced adjustment affects how the patient acts in the world. It blocks authentic expression and changes the patient's self-image.

People begin to develop beliefs about who they are and compare them to who they were before the trauma that caused the scarring. The emotional experience of the trauma is somatized by parking it in the joints, where the bone and sinews meet. In this way, the patient does not have to deal with the emotion.

Emotional processing has transitioned into a state of repression and repression in order to survive the trauma. This is typically what we see in divergent pathology. This pathology is created to give us more time to gather our resources so that at some point we can process the emotional impact of our suffering.

To maintain latency, the vital substances are used. Based on which substance is deficient, we can determine the level where the latency is held and thus which meridians are in operation to keep us alive.

### Deficiency of

- jing: KI - BL
- blood: LR - PC
- jin: SP - ST
- ye: HT - SI
- qi: PC - TE
- yang: LU - LI

As with the sinews, it is important to look at the six dermatome zones to determine where the latency is. So we always look at posture, body language and facial expression (and this especially when experiencing new things: wei qi and the reptilian brain then come into action and show whether something is seen as a threat or not).

With the divergent meridians, compared to the sinews, there is an additional dimension that allows us to determine in which zone the latency is held: the "constitutional rights. In each zone there is a 'right' that is part of our character. This can be seen as a particular strength to employ, to fulfill our path, our curriculum. With weakness or pathology in one or more zones, we can no longer deploy this right.

- If there is pathology in taiyang, the patient has difficulty expressing himself by action.
- In shaoyang, options can no longer be seen and so there are difficulties in making choices.
- With yangming pathology, patients will exhaust themselves because they cannot easily ask for help.
- In taiyin, it is difficult to hold oneself well and there is resistance to accept help.
- In shaoyin, difficulties are encountered in connecting with what is important. As a result, it takes extra effort to set boundaries and maintain sovereignty.
- Finally, when pathology penetrates to the jueyin level, life is experienced as painful and the world becomes a dangerous and hostile place to be.

Characteristics of pathology in the divergent meridians are:

- chronic inflammation of joints
- unilateral complaints
- migratory complaints
- intermittent complaints
- resource depletion
- emotion characteristics

Applied in practice: what we're actually looking for is an un-ease that seems superficial and interferes with daily activities, but is perceived by the patient as not critical. It would remind us of the sinews, but it is a deeper and chronic problem. Sometimes we are lucky if the patient tells us that the discomfort started after an event that changed their life profoundly. Sometimes it may also be that it was not a single event, but an accumulation of them, which has given the self-awareness a dent and caused the divergent meridians to act.

*When the patient suffers from chronic degenerative pain  
in the superficial regions of the body and  
the main meridian treatments did not produce the desired results,  
Then examine the divergent meridian system.*

~ Yvonne R. Farrell

Patients with unexplained, long-term scar pain and/or itching after burns, could certainly qualify.

For example, a problem area (pain and/or itching in a scar) in the BL/KI confluence:

- First, clear the pericardium loop and/or the area around CV 23 Lianquan to release the wei qi (\*)
- lower meeting point to lower qi to depth and transition to yuan qi: BL 40 Weizhong
- upper meeting point to connect yuan qi to wei qi and return to the surface: BL 10 Tianzhu

You can also add other points:

- jing-well
- points on GV or CV
- ashi points
- yuan-points: backshu, frontmu, yuan-source, he-sea
- xi-cleft points

*(\*) It would lead us too far to discuss everything surrounding Yvonne Farrell's theory here. I am therefore happy to refer to her books and lectures.*

## 6. Discussion

Wound healing is a complex matter. There are many aspects involved in healing. Initially, an increase in nerve fibers occurs, only to decrease afterwards. Due to an altered process, this does not happen or happens more slowly and abnormal scars are formed. Hypertrophic and keloid scars prevent the blood supply in the skin resulting in paresthesia, itching and pain. This greatly affects patients' recovery and quality of life.

Acupuncture is subject to many biases in the scientific context and Western thinking regarding how it works. Almost all of the studies found say that the points and techniques used are effective, yet more evidence-based research needs to be done to conclude that it really works. There is little or no consensus toward treatment.

There is potentially a lot of bias. Several authors described in their discussions:

- It is possible that the rates of patients with chronic scar itch and pain are overestimated because people who are symptom-free are less likely to participate in surveys.
- Questionnaires can be suggestive.
- It has been shown that having a belief in acupuncture treatment may have a physiological effect on the brain that could cause a powerful, non-specific response to acupuncture.
- There has been much discussion about the limitations of large studies of acupuncture treatment in general, particularly regarding the placebo effect and sham acupuncture.
- The influence of the therapist-patient relationship is also considered important for treatment outcomes, where a strong relationship can lead to more positive outcomes.
- Effects of patient expectations and therapist-patient collaboration all have the potential to influence outcomes. This makes conducting truly controlled studies in the same way drugs are tested much more challenging.

In the case studies used for this thesis, the patient's expectations and whether they had previously undergone acupuncture were not documented at the time of treatment, so it is not known to what extent this may have influenced their results.

Although case studies are considered hierarchically low in terms of quality of evidence, there is a place for demonstrating success and efficacy of the technique and adding to the evidence for acupuncture. Indeed, case studies have the scope to provide a detailed description of the treatment. This can be very valuable for practice.

Guidelines for the use of acupuncture should perhaps recognize other forms of evidence because of the difficulties in conducting RCTs in this area. Therefore, the results of case studies should not be discounted just because they have low strength in the hierarchy of evidence. (Godley, 2020)

Currently, there are no adapted forms of evidence for acupuncture.

Conventional (medicinal and/or invasive) therapies, according to several studies, have proven insufficiently useful with regard to chronic scar pain and itching and often exhibit undesirable side effects.

Acupuncture has virtually no side effects. Acupuncture is less invasive, more tolerable, cheaper and non-addictive. So in the eye of the opioid crisis, acupuncture treatments have great advantages.

## 7. Conclusion

During my search, it quickly becomes apparent that few articles can be found to answer my initial question. Although the authors almost all achieve good results with their studies and proposed treatments, the scientific evidence base is lacking due to insufficient evidence-based material.

THE questions I ask myself are: Is it at all possible to use a standardized protocol in acupuncture treatment? Will our profession then be condemned to cookbook acupuncture where every complaint has a prescription?

The limited knowledge and skills I acquired during training, together with the extensive knowledge and years of experience of colleagues, I was able and allowed to use to arrive at a basis for examining and treating a patient with chronic scar pain and/or itching. Following the conducted literature review, trial and error is also the message here.

By making a good pattern differentiation, we can get closer to the cause of the symptoms. In doing so, we can tease out what lies hidden in the depths. What may surface through our questioning, examination and palpation? Might we be able to get to the bottom of these patients, with their day-to-day life-defining pain and itchiness, and relieve them of their torment?

I hope so.



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