

Autologous Fat Grafting as Treatment of Chronic Pain

PhD-student: Martin Sollie, MD¹

Supervisors: JA Sørensen Prof. PhD, MD¹, JB Thomsen PhD¹, MD, M Rose MD²

Affiliations:

- Research Unit for Plastic Surgery, Odense University Hospital, University of Southern Denmark ¹
- Dep. Of Plastic Surgery, Hospital of Southwest Jutland, Denmark

Aim:

The purpose of this Ph.D. is to investigate the possible effect of fat grafting on chronic pain. In previous studies, fat grafting has shown promise in reducing several different kinds of chronic pain. We aim to test the effect of the treatment on two different pain syndromes; Post-Herpetic Neuralgia and Post-Mastectomy Pain Syndrome

Background and aim:

Chronic pain:

Chronic pain affects a large portion of the adult population. In Europe, the prevalence is reported to be around 19%. Chronic pain can negatively affect Quality of Life, personal life and working life. There are several types of chronic pain and this Ph.D. focuses on neuropathic pain. Neuropathic pain counts for a large portion of chronic pain and is defined, by the International Association for the Study of Pain (IASP), as "Pain caused by a lesion or disease of the somatosensory nervous system". Treatment of neuropathic pain is complex and the general guidelines consist of several types of medications, such as analgesics, anti-epileptic drugs, and antidepressants. Most medications are ineffective, have serious side effects and the potential of addiction. It is therefore important to find an effective solution for treating these patients. Fat grafting could be part of that solution.

Post-Herpetic Neuralgia (PHN)

Herpes Zoster (HZ) or Shingles, is a condition caused by the Varicella-Zoster Virus (VZV) also called Human Herpes 3 (HHV 3). The disease is a result of reactivation of a latent VZV infection in the sensory nerves. 50% will experience one or more outbreaks of shingles during their lifetime. Clinically, HZ is characterized by a painful, one-sided, rash, located to a specific dermatome of the skin. Acute pain is present before and during the rash. 90% of patients experience pain as their most prominent symptom and in 10% of cases, the pain persists and becomes chronic.

Post-Mastectomy Pain Syndrome (PMPS)

Breast cancer is the second most common form of cancer among women, with an increasing incidence. A frequent side effect to the treatment of breast cancer is chronic pain in the areas of scar tissue. The pain is characterized by a deep, burning pain in the area of the breast or the axillae, and is often triggered by shoulder movement. Pain after breast cancer

treatment has been defined as a pain syndrome, called Post-Mastectomy Pain Syndrome (PMPS). PMPS is localized to the area of previous breast cancer treatment, present at least four days a week, with an intensity of at least three or more on the Visual Analog Scale (VAS). Published studies suggests that PMPS have a significant negative impact on daily life in up to 95% of patients affected.

Fat grafting

Fat grafting is a procedure where fat is harvested from one part of the body and injected into another part, where it is needed. Fat grafting has been used in the field of plastic surgery for decades and has proven to be a simple and safe procedure. Several studies have suggested that fat grafting can be used to modulate scar tissue and have a positive effect on painful conditions. The mechanism of action has not been identified, but the current theory is that the injected fat contains stem cells, growth factors and anti-inflammatory molecules that can modulate and regenerate damaged tissue. The level of evidence is low and more research is needed.

Plan for PhD

The PhD consist of three clinical trials. Two investigating the effect of fat grafting on PHN and one on PMPS.

Study 1: PMPS

- Randomized controlled trial
- Number of participants: 40
- Intervention group: 20
 - Release of scar tissue +
 - fat injected to the area of pain.
- Control group 20

Study 2: PHN

- Pilot and feasibility trial
- Number of participants: 10
 - Fat grafting to the area of
 - pain.

Study 3: PHN

- Randomized controlled trial
- Number of participants. 46
- Intervention group: 23
- Control group: 23

Current publications:

Sollie M, Sørensen JA. Treatment of chronic post-herpetic neuralgia with autologous fat grafts: a first-in-the-world case report. *Br J Pain*. 2019;13(4):239-243.
doi:10.1177/2049463718817570