Surgical Treatment of Migraine

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Why would plastic surgeons be interested in *migraine* ?!
• I have no disclosures.
Goals:

• Overview of the surgical protocol for treatment of migraine.
• Analysis of the available evidence.
Migraine is common.....

- Prevalence:
  - 6% of men
  - 18% of women
  - one in every four households
  - > 35 million adults in the US
- More than diabetes and asthma combined.
Migraine is costly.....

- Exceeds 13 billion dollars annually as a result of lost productivity.
- Additional 1 billion of medical costs.
Cost of Health Care Among Patients With Chronic and Episodic Migraine in Canada and the USA: Results From the International Burden of Migraine Study (IBMS)

Chronic Migraine Annual Cost: 4144$
Cost of healthcare for patients with migraine in five European countries: results from the International Burden of Migraine Study (IBMS)

Chronic Migraine Annual Cost

UK: 3718 Euros
Spain: 2669 Euros
Germany: 1495 Euros
Migraine is hard to treat.....

- Lost productivity.
- Efficacy of medications.
- Side effects of medications.
It started with a serendipitous finding.
• **Rationale:**
  – Migraine is caused / triggered by peripheral compression of the sensory nerves.
  
  Analogous to other Nerve Compression Syndromes

• **Goal:** Identify and release the nerves at sites of compression.
Anatomy of the Supraorbital Nerve and its relation to the Corrugator Muscle
Compression points of the GON.
“Comparison of the Transpalpebral and Endoscopic Approaches in Corrugator Supercilli Muscle resection.”
Q1: Does this work? Is it a placebo?
• 80% noted improvement/elimination of migraine immediately after surgery, p< .0001.
• Retrospective Study.
• Prospective study, n=22.
• 95% improvement.
• No control group.

• High placebo response rate.
  – Sham surgery 70-80% effective in cardiac disease (1968) and in Meniere’s (1984) disease.
Comprehensive Surgical Treatment of Migraine Headaches

Bahman Guyuron, M.D., Jennifer S. Kriegler, M.D., Janine Davis, R.N., and Sacid B. Amini, Ph.D., M.B.A., J.D.

Cleveland, Ohio

- 125 patient.
- 92% success, 35% cure.

**Annual Cost: 7612 $ to 925 $.**

- Placebo ??
A Placebo-Controlled Surgical Trial of the Treatment of Migraine Headaches

Bahman Guyuron, M.D.
Deborah Reed, M.D.
Jennifer S. Kriegler, M.D.
Janine Davis, R.N.
Nazly Pashmini, M.D.
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Cleveland, Ohio

Background: Many of the nearly 30 million Americans suffering with migraine headaches are not helped by standard therapies, a proportion of which can harbor undesirable side effects. The present study demonstrates the efficacy of independent surgical deactivation of three common migraine headache trigger sites through a double-blind, sham surgery, controlled clinical trial.

Methods: Seventy-five patients with moderate to severe migraine headache who met International Classification of Headache Disorders II criteria were studied. Trigger sites were identified (frontal, temporal, and occipital), and patients were randomly assigned to receive either actual or sham surgery in their predominant

• Randomized Control Trial.
• Sham surgery.
• 49 actual surgery (single site). 26 sham surgery
• Complete elimination: 57% vs 4% (p<.0001)

THE STUDY THAT MADE EVERYONE TAKE THIS SERIOUSLY
Five-Year Outcome of Surgical Treatment of Migraine Headaches

Bahman Guyuron, M.D.
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Janine Davis, R.N.
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Cleveland, Ohio

Background: This study was designed to assess the long-term efficacy of surgical deactivation of migraine headache trigger sites.

Methods: One hundred twenty-five volunteers were randomly assigned to the treatment (n = 100) or control group (n = 25) after examination by the team neurologist to ensure a diagnosis of migraine headache. Patients were asked to complete the Medical Outcomes Study 36-Item Short Form Health Survey,

• 79 patients completed 5 year follow up.
• 88% benefited from surgery
  – 28% complete elimination
  – 59% significant improvement
Q1

• **Does it work?**
  – Retrospective, Prospective, and Randomized Controlled trials have all shown significant and lasting results.

• **Is it a placebo?**
  – 88% over 5 years.
  – *The first study.*
  – *RCT with Sham Surgery*
Q2: Are these results reproducible?

- Dirnberger et al (University of Vienna, Austria, Sep 2004)
- Poggie et al (University of Kansas, July 2008)
- Ducic et al (Georgetown University, May 2009)
- Janis et al (UT Southwestern, June 2011)
- Paul Cederna (University of Michigan, Jan 2011)
Surgical Treatment of Migraine Headaches by Corrugator Muscle Resection

Franz Dirnberger, M.D., and Klaus Becker, M.D.
Vienna, Austria

- Senior author tried it on himself (Feb 2001).
- 80% relief after 20 years of migraine.
- Waited for 6 months to ensure long lasting relief.
- 60 patients.
- 68% success at 6 months.
- Personal Communication: July 19, 2011.

“160 patients … over all success rate 70% …. One third of the patients experienced a total remission”
Confirmation of Surgical Decompression to Relieve Migraine Headaches

Joseph T. Poggi, M.D.
Brett E. Grizzell, M.D.
Stephen D. Helmer, Ph.D.

Wichita, Kan.

**Background:** Surgical decompression of various trigger sites has been shown by two authors to relieve migraine headaches. The purpose of this study was to evaluate the effectiveness of surgical decompression of multiple migraine trigger sites in a clinical practice setting, and to compare the results to those previously published.

**Results:**

- 89% of patients had >50% improvement
- 17% complete relief.
- 39% discontinued all medications.
Validation of the Peripheral Trigger Point Theory of Migraine Headaches: Single-Surgeon Experience Using Botulinum Toxin and Surgical Decompression

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Jessica H. Howard, B.A.
P.A.-S.
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**Background:** Migraine headache is a widespread neurovascular disorder that is often suboptimally or incompletely treated. This article confirms the efficacy of botulinum toxin treatment with surgical decompression as a deactivator of migraine headache trigger sites through the retrospective analysis of a single surgeon’s experience.

**Methods:** A retrospective chart review was performed on 24 patients presenting

- **79% success (9% complete, 70% significant).**
Indications and Outcomes for Surgical Treatment of Patients with Chronic Migraine Headaches Caused by Occipital Neuralgia

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Ethan E. Larson, M.D.
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**Background:** Occipital neuralgia is a headache syndrome characterized by paroxysmal headaches localizing to the posterior scalp. The critical diagnostic feature is symptomatic response to local anesthetic blockade of the greater or lesser occipital nerve. Further characterization is debated in the literature regarding the diagnosis and optimal management of this condition. The authors

- 206 patient.
- 43% complete elimination
- 80% significant improvement.
Q3: This does not reconcile with our current understanding of migraine.

- Central / Peripheral theories.
- Botox?
Q3: This does not reconcile with our current understanding of migraine.

- How do you diagnose migraine? How do you assess the results of treatment?

- How many patients have been cured from migraine?
The role of the neurovascular scalp structures in migraine

Carlo Cianchetti

Abstract

Aim: To review reports suggesting a role for neurovascular scalp structures in migraine.

Main data reported: (A) Scalp periarterial nervous fibres contain all the main peptides and receptors involved in pain. (B) It is possible to interrupt or alleviate migraine pain with a prolonged compression of the main scalp arteries, which decreases blood flow through the pain-sensitized vessels and probably induces a temporary conduction block of periarterial nociceptive fibres. (C) Painful points are present on the scalp arteries of a considerable percentage of migraine sufferers. (D) It is possible to stop or alleviate pain by intervening on nociceptive periarterial fibres, as for example with the injection of lidocaine or 3–5 ml saline, and with percutaneous application of a capsaicin cream.

Conclusion: The data reported suggest a role for neurovascular scalp structures in at least some patients with migraine. It would be of interest to find a clinical distinction between patients according to the prevalence of an intracranial or extracranial peripheral pain mechanism. This could lead to more efficacious treatments.
Peripheral Nerve Blocks and Trigger Point Injections in Headache Management – A Systematic Review and Suggestions for Future Research

Avi Ashkenazi, MD; Andrew Blumenfeld, MD; Uri Napchan, MD; Samer Narouze, MD, MSc; Brian Grosberg, MD; Robert Nett, MD; Traci DePalma, MD; Barbara Rosenthal, MD; Stewart Tepper, MD; Richard B. Lipton, MD, on behalf of the Interventional Procedures Special Interest Section of the American Headache Society

Interventional procedures such as peripheral nerve blocks (PNBs) and trigger point injections (TPIs) have long been used in the treatment of various headache disorders. There are, however, little data on their efficacy for the treatment of specific headache syndromes. Moreover, there is no widely accepted agreement among headache specialists as to the optimal technique of injection, type, and doses of the local anesthetics used, and injection regimens. The role of corticosteroids in this setting is also debated. We performed a PubMed search of the literature to find studies on PNBs and TPIs for headache treatment. We classified the abstracted studies based on the procedure performed and the treated condition. We found few controlled studies on the efficacy of PNBs for headaches, and virtually none on the use of TPIs for this indication. The most widely examined procedure in this setting was greater occipital nerve block, with the majority of studies being small and non-controlled. The techniques, as well as the type and doses of local anesthetics used for nerve blockade, varied greatly among studies. The specific conditions treated also varied, and included both primary (e.g., migraine, cluster headache) and secondary (e.g., cervicogenic, posttraumatic) headache disorders. Trigeminal (e.g., supraorbital) nerve blocks were used in few studies. Results were generally positive, but should be taken with reservation given the methodological limitations of the available studies. The procedures were generally well tolerated. Evidently, there is a need to perform more rigorous clinical trials to clarify the role of PNBs and TPIs.
Q4: Plastic Surgeon?

- It was the patients who brought it to us.
- Facial Anatomy, Facial Aesthetics, Peripheral Nerves.
Q5: Does headache justify such an invasive procedure?

- Extracranial (soft tissue) procedure.
- Outpatient / 23 hr short stay procedure.
- 2-3 hour per position.
• Is there a chance for complications? YES.

• Most common side effect: elimination of wrinkles and a brow lift.

• Others:
  – Parasthesis, hyposthesia.
  – Alopecia.
  – Persistent Pain, stiffness.
  – Nerve Injury
Q6: Why not Botox for life?

- Botox is a viable option.
- History of treatment of Carpal Tunnel Syndrome, Cubital Tunnel Syndrome, etc.
- Convenience.
- Botox non responders, short duration, resistance.
A Socioeconomic Analysis of Surgical Treatment of Migraine Headaches

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Dallas, Texas; Durham, N.C.; and Cleveland, Ohio

Background: This study is meant to compare the direct and indirect cost of migraine headache care before and after migraine surgery and to evaluate any postoperative changes in patient participation in daily activities.

Methods: Eighty-nine patients enrolled in a migraine surgery clinical trial completed the Migraine-Specific Quality-of-Life Questionnaire, the Migraine Disability Assessment questionnaire, and a financial cost report preoperatively and 5 years postoperatively.

- 63 (57-72) months follow up.

- **Annual Cost** 5820 $ → 900 $
- Medications ↓ 1997$
- Alternative ↓ 450 $
- PCP visits ↓ 320 $
- Missed work days ↓ 8.5 days
How to localize the site?

• Clinical exam:
  – Most important is site of pain.

• Diagnostic Injections (botox, marcaine, steroids).

• Examined by a Neurologist.
Conclusion

Is there enough evidence to justify offering surgical treatment of migraine?

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