

DR. GORDON'S PERICRANIAL-ONLAY CRANIOPLASTY TECHNIQUE^{1,3}: Best Practices in Secondary Cranial Reconstruction*

COMMON NEEDS FOR CRANIOPLASTY¹

Neuro Trauma

1. Emergent decompressive craniectomy postcraniotomy

Neuro Oncology

1. Brain neoplasms with calvarial extension
2. Skull neoplasms
 - a. Primary (i.e. intraosseous meningioma)
 - b. Metastatic Lesions

Revision

1. Sterile bone resorption +/- osteomyelitis**
2. Soft Tissue Dehiscence after primary craniotomy with exposed bone flap*

Timing Considerations*

- 90 day time interval on average from time of bone removal to time of implant placement
- Non-delayed incisional scalp healing
 - No Swelling

Timing Considerations*

1. Single-stage Cranioplasty with intra-operative implant size modification²
2. 90 day time interval
 - Non-delayed incisional scalp healing
 - No Swelling

Timing Considerations*

- 90 day time interval
- Non-delayed incisional scalp healing
 - No Swelling

**Bone culture required

If bone culture results are abnormal (p. acnes), 6 months delay

PREOPERATIVE PLANNING¹

Scalp Examination

- Open Wounds (new & old), incisional scabs, delayed wound healing, areas of alopecia, inherent scalp mobility, scalp thickness, signs of previous surgical incisions/scalp reconstruction



CT Scan

- Assess defect for surgical planning, quantify coexisting soft tissue atrophy (pterional region)
 - Used for custom implants



Patient Specific Implant

Autologous bone to PSI in situations greater than 1 month after craniotomy/craniectomy and/or temporal hollowing¹

*The material contained in this technique algorithm represents Dr. Chad Gordon's conclusions based on his own practice and clinical experience with cranioplasties. Dr. Gordon is a paid consultants of DePuy Synthes Companies of Johnson & Johnson.



Pericranial-Onlay Technique

Procedure Goal: Achieve a tensionless closure to allow a healthy scalp incision recruiting additional scalp laxity through the release of subfascial (subgaleal) ligaments during the fascia-skin flap elevation while also leaving underneath an undisturbed, vascularized pericranial-onlay flap. This type of dissection plane accompanies multiple benefits such as decreased bleeding, durotomy, seizures and decreased cerebrospinal fluid leaks.^{1,3}

Summary Video⁴:



PATIENT PREP^{1*}

1 Scalp is shaved



Sterilization:

2

1. Scrubbed with iodine solution
2. Wet iodine-based prep
3. Iodine Povacrylex solution

3

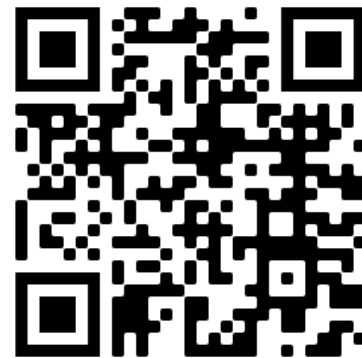
Previous incisions and bony defect marked (hash-lines)

4

Preemptive anesthesia:

- Injected into scalp, 50:50 mixture of 1% lidocaine with epinephrine and sterile saline (parallel injection away from brain)

Technique Part One:



*Surgeon present for/participates in



SURGICAL TECHNIQUE¹

5

Initial Incision with Scalpel, Colorado needle cautery completes incision to bone. Scalp mobility achieved with periosteal elevator and cautery (galeal scoring as needed)



6

Skull defect dissected in the supra-pericranial plane leaving behind a vascularized pericranial-onlay flap, which remains undisturbed above the dura*



7

Implant placement



8

Tension-free Scalp Closure



Technique Video Part Two:



Technique Video Part Three:



*Note: it is important to remain in the proper plane to avoid durotomy/brain injury or scalp perfusion interruption.

REFERENCES

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2. Berli J, Thomaier L, Zhong S, Huang J, Quinones A, Lim M, Weingart J, Brem H, and Gordon C. Immediate Single-Stage Cranioplasty Following Calvarial Resection for Benign and Malignant Skull Neoplasms Using Customized Craniofacial Implants. *The Journal of Craniofacial Surgery* Volume 26, Number 5, July 2015.
3. Gordon C, Fisher M, Liauw J, Lina I, Puvanesarajah V, Susarla S, Coon A, Lim M, Quinones-Hinojosa A, Weingart J, Colby G, Olivi A, Huang J. Multidisciplinary Approach for Improved Outcomes in Secondary Cranial Reconstruction: Introducing the Pericranial-Onlay Cranioplasty Technique. *Operative Neurosurgery* Volume 10, Number 2, June 2014.
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