Spinal Injections

• Can be beneficial for both chronic and acute pain depending on pathology
• Contraindications:
  – Patient refusal
  – Active infection
  – Platelets less than 75 or inability to stop anticoagulation
• Indications:
  – Moderate to severe pain
  – Therapeutic and/or diagnostic value
  – Allow patient to progress in physical therapy and improve function
Interventional Pain Management

• Lumbar medial branch injections
  – Followed by radiofrequency ablation/neurotomy (RFA)
• Lumbar epidural steroid injections
  – Interlaminar vs transforaminal epidural
• Spinal cord stimulation (Dr. Sales)
• Vertebroplasty/Kyphoplasty
• RFA of Hip/Knee/Sacroiliac joint
Lumbar epidural injections

- Therapeutic and/or diagnostic
  - Transforaminal (TF-ESI) can help the surgeon isolate the pain generator
  - Used in conjunction with physical therapy to improve patient function
- Effective for short term management
- Clinical judgement for chronic low back pain
Spinal Cord Stimulation (SCS)

• Chronic neuropathic pain
  – Failed back syndrome
  – Complex regional pain syndrome
  – Phantom limb pain
  – Diabetic peripheral neuropathy
  – Peripheral arterial disease
  – Cancer pain
Vertebroplasty/Kyphoplasty

- Vertebroplasty
- Kyphoplasty
Vertebroplasty/Kyphoplasty Debate

• There is no consensus due to multiple conflicting studies
  – NEJM in Aug 2009 showed no pain relief, but there was no
distinction between acute vs chronic VCF
  – Lancet in 2010 had their own randomized trial showing great pain
  relief at one month and one year later

• Practical management
  – Interventional procedures considered if patient is incapacitated
  (inpatient) or fails 2-4 weeks of conservative management
  – Vert/Kyphoplasty only done for acute/subacute fractures with
  some evidence of edema on MRI
Lumbar/Thoracic/Cervical facet pain

- Most common and most studied use of radiofrequency ablation (RFA) for chronic pain
- Addresses primarily axial pain arising from cervical, thoracic, and lumbar facet joints
- Very common cause of pain after surgery
  - Failed back syndrome, junctional disease
  - After lumbar laminectomy
Facet mediated pain

• **Step 1:** Lumbar/Cervical medial branch injection
  – Pain diary to record the efficacy
  – Repeat injection to confirm diagnosis (minimize chance of false positive)

• **Step 2:** RFA to denervate the lumbar facet joint

• **EBM (Spine Journal 2017):**
  – Meta-analysis of 7 randomized controlled trials with 454 patients for 1 year follow up
  – 95% in RFA group had improvements
Pain Referral Patterns

Cervical Facet Joint - Pain Referral Patterns -

Facet Referral Pattern

FIG. 1. Referred pain distribution. 1. lumbar spinal region; 2. gluteal region; 3. trochanter region; 4. lateral thigh region; 5. posterior thigh region; 6. groin region.
Cervical MBB

Medial branch blocks can also be done in the cervical and thoracic

The only downside is that most insurances will not allow for RFA of the thoracic spine
Radiofrequency Ablation (RF)

• Lesions peripheral nerves
  – Conventional: >45 degrees celcius
  – Pulsed: less than 42 degrees

• Uses high frequency alternating current to heat tissue
• RF typically provides pain relief for over 6 months
Lesion Size and Probe

- Conventional RF needle:
- Water-cooled RF needle:
Why Consider RF?

• Minimally invasive
• Recovery time is minimal
  – 2-5 days
• Excellent choice for patients who
  – Are not good surgical candidates
  – Don’t want surgery
  – Pain despite surgery
How much relief?

- “You get to try it before you buy it”
- Diagnostic blocks are done with local anesthetic before radiofrequency ablation
- Typically at least one block is done first
- RF procedure considered if patient gets at least 50% pain relief
RF for Hip

• Who is a good candidate
  – Patients with prior hip replacement
  – Also an option for cancer pain
  – Not surgical candidates

• The target nerves are the sensory branches of the femoral and obturator nerves

• Sensory/Motor testing is performed prior to ablation
RF Hip
Sensory innervation of the hip

Femoral and obturator primarily innervate the anterior lateral and medial capsule
Evidence Based Medicine

• Most of the evidence is based on case reports
• No large, multicenter placebo controlled studies have been done for the hip
• Many confounding factors which is why diagnostic block is vital to decide if this procedure is appropriate for patients
RF Knee

• Can be done with both conventional and water cooled RF needles

• Target are the genicular nerves
  – Superior lateral and medial
  – Inferior medial

• Diagnostic block done prior to ablation

• Great option for patients who are non-surgical candidates
Genicular nerve block
RF Knee- water cooled
EBM Knee

- Many case reports to support procedure
- One recent placebo controlled double blinded study to support RF knee
  - 19 patients in each treatment arm
    - Control (lidocaine) vs RF
- Study found the VAS, oxford knee score, and global perceived effect all improved 4 and 12 weeks in the RF group
RF Knee- EBM

![Visual analogue scale graph showing comparison between control group and RF group across different time points.](image-url)
Clinical Experience

• RF for orthopedic injuries allow patients to perform physical therapy, overcome painful exacerbations, and sometimes are done prior to their surgery
• Goals and expectations must be clearly explained to patient
• Functional improvement, weight loss, decrease in pain medications are common goals
Sacroiliac Joint Dysfunction

- Common cause of 5-30% of low back pain
- Low back, buttock, groin, and/or posterior leg pain
- More common if:
  - Lumbar fusion
  - Spondyloarthropathies (ie ankylosing spondylitis)
  - Gait abnormality
  - Leg length discrepancy
SIJ dysfunction

• Conservative management
  – Physical therapy (aquatic and land based)
  – Manipulation, osteopathic or chiropractic
  – Oral medications
  – Sacroiliac joint belts
  – Massage therapy
  – CAM (acupuncture, etc)
SIJ dysfunction

• Diagnosis is made clinically and confirmed with sacroiliac joint injection
• Ablation is considered if injection only provides short term relief
• Two common methods to ablate the sacroiliac joint (L5-S3 medial branch nerves)
  – Water cooled (Synergy)
  – Multi-lesion probe (Simplicity)
Water cooled SIJ ablation
• 2 recent studies using water cooled method
  – Steltzer: retrospective case series of 126 patients
EBM

• Patel: prospective, placebo (sham intervention), single site study of 52 patients
• Outcomes were measured at 12 months
• Mean decrease in NRS (numeric rating scale) was 2.7
• Function improved based on SF-36 of 15.8
• Oswestry disability scale decrease of 13.9
Simplicity Probe

• ‘Strip lesion’ along the entire sacroiliac joint created
• Less timing consuming, similar recovery time
SIJ RF
• Schmidt: Retrospective study of 77 patients from two academic centers (Virginia Mason, and Univ of Virginia)
• 16 out of 77 failed to respond
• 55% had greater than 50% pain relief at 6 months
• Inclusion criteria was not as selective as the water cooled study- steroid was used in diagnostic injection
Contraindications to RF

- Patient does not want procedure
- Platelets less than 75
- Unable to stop blood thinner
  - Bleeding disorder
- Active infection
Complications

• Serious complications are uncommon
  – Infection
  – Hematoma
  – Nerve injury (motor testing done prior to RF)

• Post-procedural pain, 2-5 days

• Post-op neuritis
  – ‘sunburn’, hypersensitivity of skin