Selective Wrist Injections & Denervation

L. Andrew Koman MD
Conflict of interest

None
**Historical Basis wrist denervation**

- 1984 Dellon & Mackinnon – terminal AIN pain source
- 1966 Wilhelm – “total” denervation
- 1998 Berger – single incision
- 2002 Weistein & Berger – correlation with injection
**Wrist Injection**

**Technique:**

- Serial blocks sensory nerves to assess impact on pain & function Salvage procedure
- Evaluate potential impact of denervation
  - Freeland 88%
  - Weinstein; Berger -76%
Wrist injection: technique

Dorsal:
- palpation or ultrasound
- Inject 1-2 cc dorsal IM
- Penetrate IM
- Aspirate
- Inject 1-2 cc dorsal IM

Evaluate pre and post
- Pain scale
- Grip
Wrist Injection

May provide intermediate pain relief
Wrist Denervation: why?

- Salvage procedure
- Minimally traumatic
- Temporary partial pain relief
- Potential functional improvement
Indications for Wrist Injection & Denervation?

Painful wrist disorders:

Late stage --

- SNAC
- SLAC
- Arthritis
- Kienbachs disease
Wrist Innervation – extensive

- Ulnar nerve (dorsal sensory branch to wrist)
- Radial nerve (sensory branch from posterior interosseous)
- Lateral antebrachial cutaneous nerve (terminal)
- Medial antebrachial cutaneous nerve (terminal)
- Median nerve (anterior interosseous nerve, palmar cutaneous branch, and thenar branch)

[15 articular branches]
Technique Options

- Extensive (Wilhelm)
  - 4-5 incisions
- Limited (Berger)
  - 1 incision

Total denervation almost impossible – minimal Charcot concerns
Wrist Denervation: technique

Single Incision:
- 3-4 cm dorsal
- Isolate PIN dorsal IM
- Excise 1 cm
- Open IM
- Identify PIN
- Excise 1 cm

From Mayo Clinic
long term (6 years) results of Wilhelm denervation

“Wrist denervation resulted in improvement in pain scores in 39 patients despite radiological deterioration noted in 34 after 6 years.”

Evaluation single incision AIN /PIN denervation

50 wrists (48 patients)
Pain, Grip, ROM

Results:
Pain - decreased (p<0.001)
ROM not worse
Grip - increased (p<0.001)
DASH – improved (p<.0039)
Anterior and Posterior Interosseous Neurectomy for the Treatment of Chronic Dynamic Instability of the Wrist.
Hofmeister et al. Hand 2006. 1:63-70

Kaplan-Meier analysis using subsequent surgical intervention as the endpoint demonstrated a 68% survival rate at 28 months. From Hofmeister et al.

68% survivorship 28 months
Ligament reconstruction - 4
Limited arthrodesis - 12
Predictive Value Blocks

“no correlation between pain relief after block and follow-up postoperative pain relief “

“improvement in grip strength after diagnostic block was predictive of improvement in grip strength at follow-up”
Predictive Value Blocks

“failure of improvement in grip strength and pain relief with the diagnostic injection, failure of AIN/PIN neurectomy approached statistical significance (p = 0.0586).”
Wrist Denervation – Safe?

- AIN / PIN ablation do not impact proprioception
  (Gay ... Berger et al 2011 Wrist Denervation Does Not Impair Proprioception. JHS 36:1774-79; 2011)
- No documented Charcot arthropathy
- Insignificant impact on 2° surgery
- No loss of motion
Wrist Denervation – Indications

PAIN > 3 preferably 6 months

- Dynamic carpal instability (Hofmeister et al.)
- static dissociative carpal instability (Weinstein et al)
- Arthritis (Weinstein et al)
- Kienbachs (Whilhelm)
- Nonunion (Whilhelm)
What do I do? 

**S’s**

- Six months or more pain
- Satisfied that patients that are comfortable with palliation and additional procedures in future
- Selective injections only when concern over secondary gain – pain and GRIP
- Single dorsal Incision
- Salvage -- next definitive procedure ie arthrodesis
Thank you
Wrist Denervation: references


Freeland, AE MD and D.T. Batarseh, MD, Jackson, MS. Partial Denervation of the Wrist for Chronic Pain. Datatrace Publishing

Wrist Denervation: references


Wrist Denervation

quality of life