

# Posterior Bone-graft Options and Success in Single-Level Circumferential Lumbar Fusions

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# Disclosures:

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Licensing Agreement: FG Solco



# Introduction

- Achieving spinal fusion requires bone graft and is most reliable using an anterior/posterior technique.
- The bone graft for the posterior fusion may come from a variety of sources.
- IBG, but this may result in additional postoperative pain.
- Alternatives are currently the most common form of bone graft for PSF.
- Lack of knowledge as to the superiority of one alternative over another.

# Study Purpose

To determine the ability to achieve a solid PSF using sources of bone graft from 6 sources:

- IBG
- Bone morphogenic protein (BMP)
- Stem cells derived from:
  - Autologous bone marrow aspirate (BMA, concentrated)
  - Allograft bone
  - Allograft fat
  - Allograft amniotic membrane/fluid.



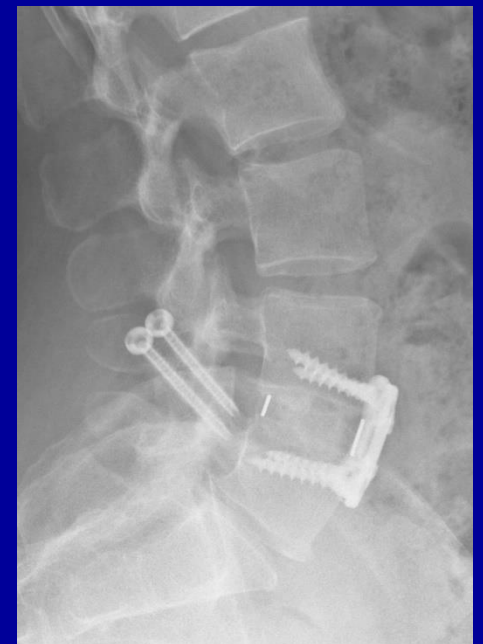
# Methods

- Randomized, prospective, single blinded.
- 27 patients each group\*, single level DDD.
- Outcomes:
  - LBP & leg VAS
  - Pain Drawing
  - ODI
  - Procedure success
  - Pain meds
- Follow-up: >2 yr.



# Methods

- All patients had ASF with BMP (small).
- All patients had anterior plate and posterior facet screw instrumentation.
- PSF: 5cc of study “graft” + local bone graft.
- High resolution CT scans at 1 yr post-op.
- Costs related to bone graft.
- 15% to 33% had prior decompressions.



# Results

- Average age 52 yrs old.
- 54% females.
- Fat allograft stem-cell “graft” withdrawn from market.
- 41% smokers.
- 15% to 33% (24% mean) had prior decompressions.
- 40% concurrent decompressions.
- 38% concurrent adjacent level disc dehydration.

# Results – CT scans



Bone *allograft* derived STEM cell product



# Results – CT scans

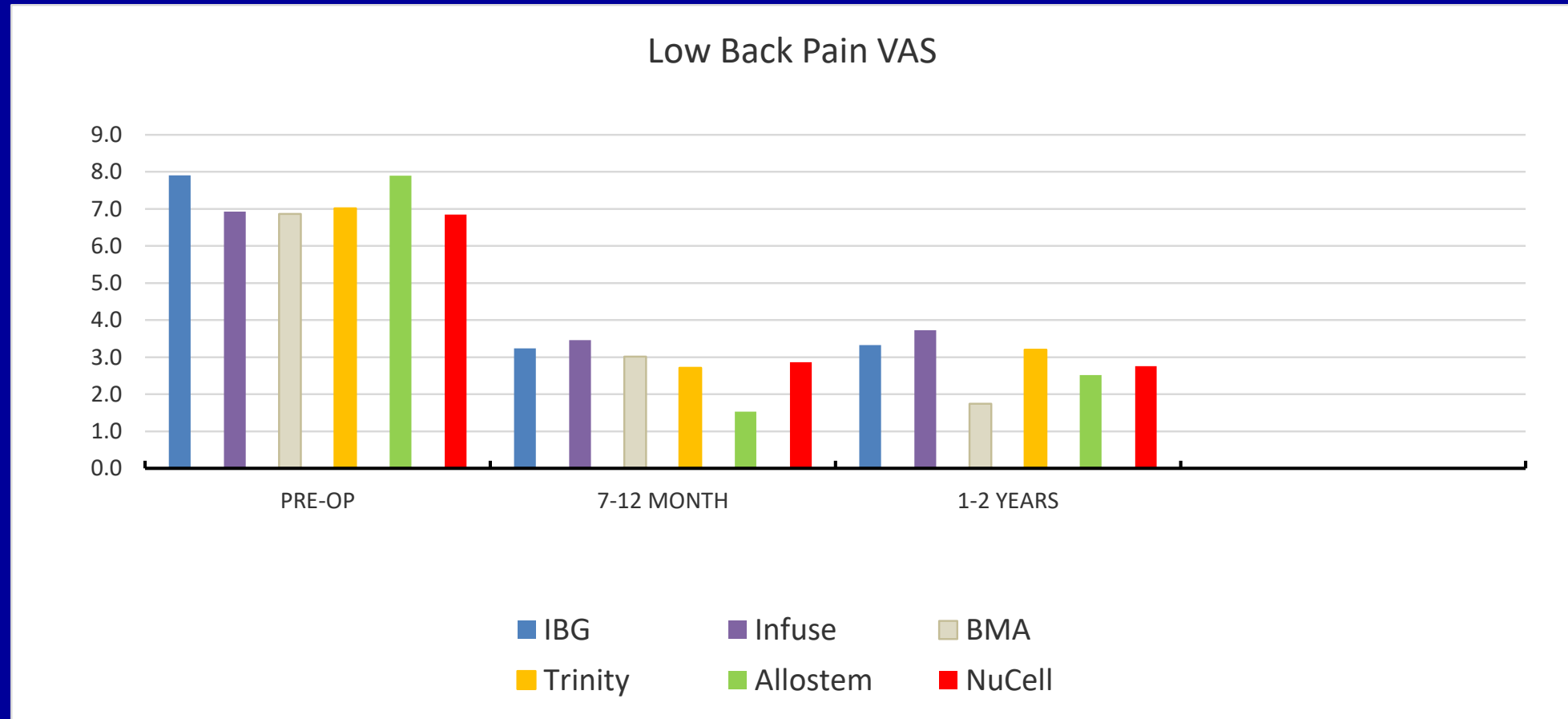
## Pseudarthrosis rates:

- IBG = 2%
- BMP = 7%
- Stem cell, BMA concentrate = 16%
- Stem cell, Allograft bone = 30%
- Stem cell, Allograft fat = 36%
- Stem cell, Allograft amniotic fluid = 38%
  
- Anterior = 2/149 (1.3 %)

# Results – Costs

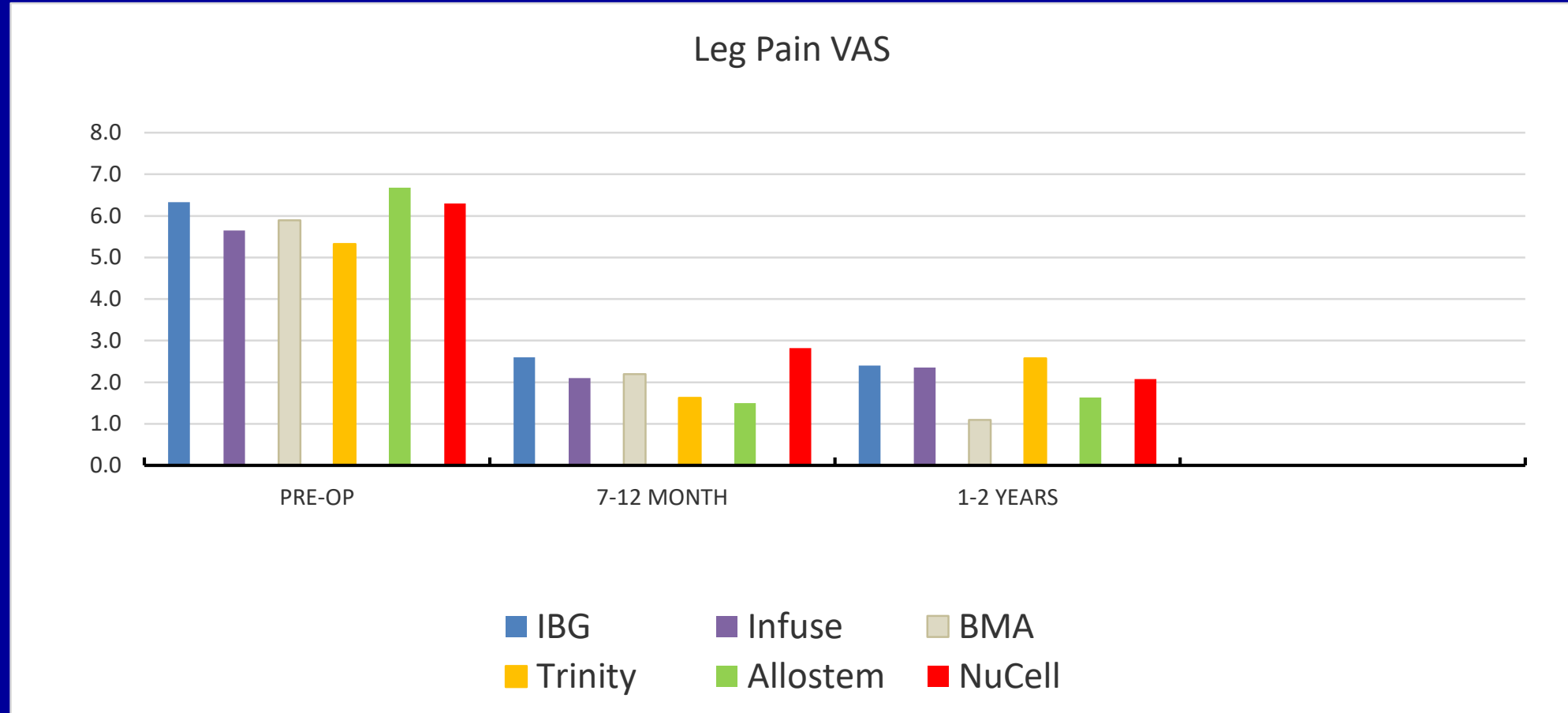
- IBG = \$0 + time
- BMP = \$3451 !!
- Stem cell, BMA concentrate = \$1500 (centrifuge disposables) + \$160 (allo chips)
- Stem cell, Allograft bone = \$2727
- Stem cell, Allograft fat = \$2768
- Stem cell, Amniotic fluid/membrane = \$2056 + \$160 (allo chips)

# LBP Outcomes



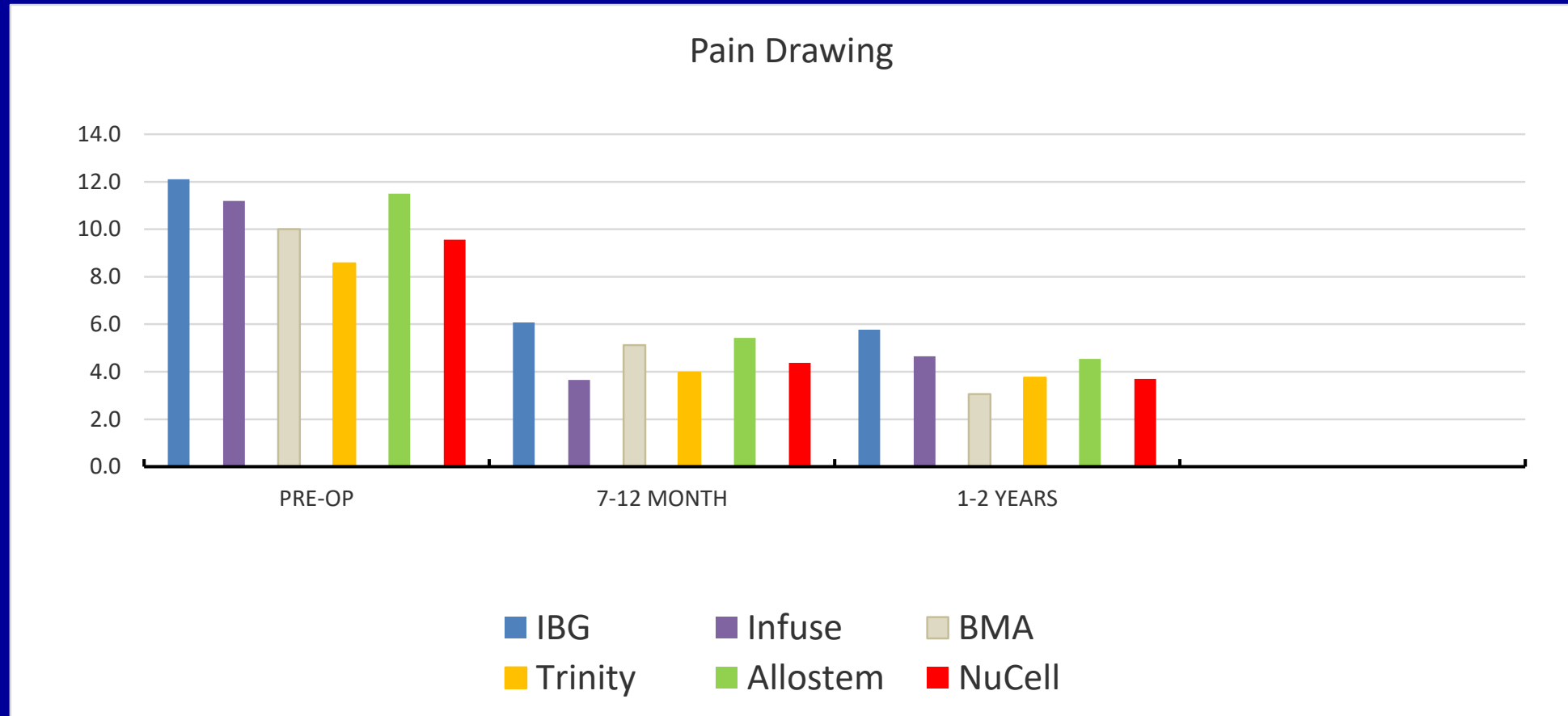
All groups had significant improvement postop but no difference between groups

# Leg Pain Outcomes



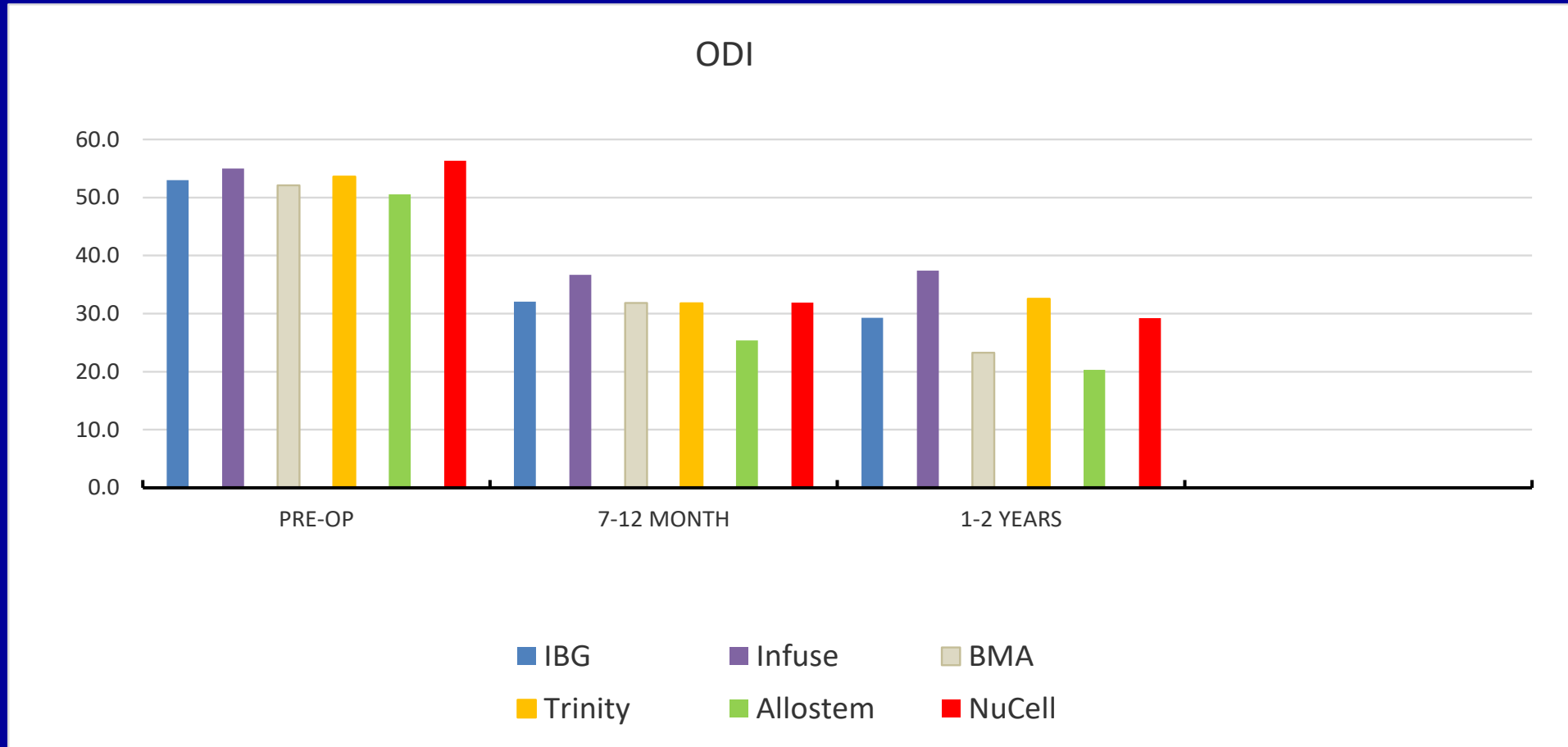
All groups had significant improvement postop but no difference between groups

# Pain Drawing Outcomes



All groups had significant improvement postop but no difference between groups

# Disability Outcomes



All groups had significant improvement postop but no difference between groups

# Pain Med Usage

- Preop:
  - 55% NSAIDS
  - 62% opioids
- 1 yr Postop:
  - 34% NSAIDS
  - 26% opioids



# Treatment Success

- Successful:
  - 91%
- Would do again :
  - 84%
- Would recommend to others:
  - 87%





# Limitations

- Confounding effects
  - Adjacent DDD, SI joint, hip
  - Osteoporosis
  - Variable opioid tolerance, greater than prior study 10+ years ago
- Fusion rate of *allograft chips only* not studied prospectively

# Discussion - Conclusions

- IBG and BMP have high fusion rates.
- Stem cell *autograft* (BMA) has acceptable fusion rate.
- Stem cell *allograft* products need enhancement.
- BMP is most expensive.
- Cost/benefit of stem cell allograft products is high.

