

---

---

---

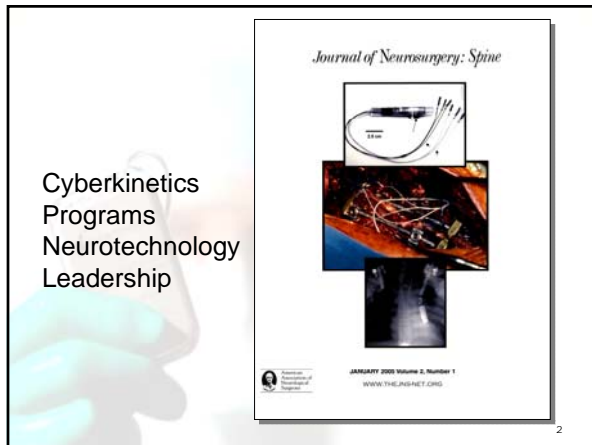
---

---

---

---

---



---

---

---

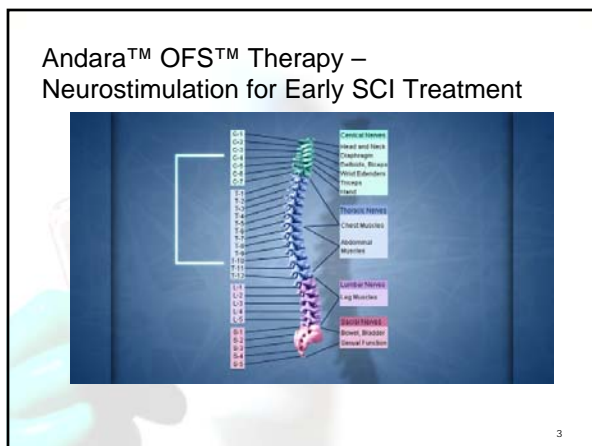
---

---

---

---

---



---

---

---

---

---

---

---

---

Andara™ OFS™ Therapy –  
Neurostimulation for Early SCI Treatment



Injury

4

---

---

---

---


---

---

---

---

Andara™ OFS™ Therapy –  
Neurostimulation for Early SCI Treatment



Injury

5

---

---

---

---


---

---

---

---

Andara™ OFS™ Therapy –  
Neurostimulation for Early SCI Treatment



Injury

6

---

---

---

---

---

---

---

---

### Andara™ OFS™ System Extensive Scientific Foundation

- 1920 – First Report of Responses of Isolated Nerve Fibers to Applied DC Voltages
- 1979 - 1989 – First Well Controlled, Modern Demonstration of Electrical Field Responses by Ganglion of Explanted Nerve Cells
  - Nerve fibers grow toward Cathode; retract away from Anode
  - Lag time between growth, retraction
  - Nerve fibers re-orient in parallel to long axis of voltage gradient
  - Cells react to voltage gradient by producing new fibers
- 1983 – First Report of Application of DC Voltages to Spinal Cord Injury *in vivo* (lamprey)
- 1987 - First Reported Application of Oscillating Field Direct Current to Spinal Cord Injury *in vivo*
- 1993, 1999 - Publication of Andara OFS Dog Studies
- 2004 – Publication of Andara OFS Pilot Trial

7

---

---

---

---

---

---

---

---

---

---

### Andara™ OFS™ Technology Rationale

Constant Field: Accelerates Nerve Fiber Growth, Retrograde Dieback Still Occurs

Oscillation: Growth Towards Both Poles, Avoids Dieback

- Nerves grow toward negative pole using low-voltage, direct current (battery)
- Extend fast, retreat slowly (die-back)
- Plasticity allows body to leverage “new” connections

8

---

---

---

---

---

---

---

---

---

---

### Nerves Respond to Electrical Fields

- Oscillating, direct current
- Based on fundamental cell properties and embryology
- More than 20 years of research
- More than 240 publications
- Three issued and 10 published patents
- 14 patients clinical trial in spinal cord injury
- Applications in spinal, peripheral nerve, and traumatic brain injuries

9

---

---

---

---

---

---

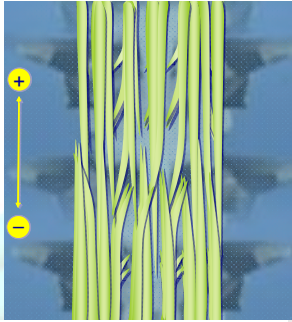
---

---

---

---

### Nerves Respond to Electrical Fields



- Oscillating, direct current
- Based on fundamental cell properties and embryology
- More than 20 years of research
- More than 240 publications
- Three issued and 10 published patents
- 14 patients clinical trial in spinal cord injury
- Applications in spinal, peripheral nerve, and traumatic brain injuries

10

---

---

---

---

---

---

---

---

---

---

### Andara™ OFS™ System Pre-Clinical and Clinical Data

**Preclinical Results**

- Multiple studies in cell culture, small and large animals
- Two randomized, sham surgery trials in naturally injured dogs (58 subjects)
- Outcomes measured: Histology, electrical conductance, function

**Clinical Results**

- 14-patient IDE trial (1 LTFU)
- All entrants clinically “complete” (AIS A: No movement or sensation below level of injury) and SSEP verified
- No transection or gunshot wound
- 8 cervical and 5 thoracic injuries
- Implant within 18 days of injury; explant at 15 weeks
- Favorable safety profile

11

---

---

---

---

---

---

---

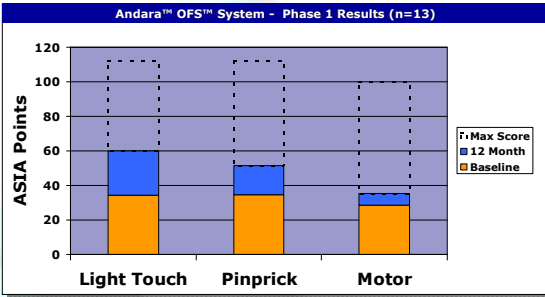
---

---

---

### Andara™ OFS™ System – Improvement from Baseline

Andara™ OFS™ System - Phase 1 Results (n=13)



Category	Baseline	12 Month	Max Score
Light Touch	~35	~61	120
Pinprick	~35	~51	120
Motor	~30	~36	120

↑ 25.9 pts.    ↑ 16.8 pts.    ↑ 6.9 pts.  
 ↑ 75.9%      ↑ 48.9%      ↑ 24.2%  
 p<.001      p=.001      p=.001

12

---

---

---

---

---

---

---

---

---

---

### Responder Definition

- **Responder has improvement beyond likely spontaneous recovery**
  - Spontaneous recovery is usually limited to the first level immediately below the **zone of partial preservation (ZPP)**.
  - Recovery at the second level below the ZPP is rarely seen (Fawcett 2006).
- **Responder defined as having sensory or motor recovery at or below the second level below the ZPP.**

**Therapy response definition illustrated for a hypothetical case of injury below C4.**

13

---

---

---

---

---

---

---

---

---

---

---

---

### Most Andara OFS Patients Responded

Patient	Length of Response Interval (root levels)		Motor Responder	Sensory Responder	Motor or Sensory Responder
	Motor	Sensory			
01	0	11	No	Yes	Yes
02	0	4	No	Yes	Yes
05	0	1	No	Yes	Yes
CU	0	0	No	No	No
07	0	22	No	Yes	Yes
06	0	4	No	Yes	Yes
08	0	22	No	Yes	Yes
04	1	0	Yes	No	Yes
09	5	1	Yes	Yes	Yes
10	1	7	Yes	Yes	Yes
11	0	8	No	Yes	Yes
12	1	15	Yes	Yes	Yes
13	0	22	No	Yes	Yes
Total Number of Responders			4 / 13 (31%)	11 / 13 (85%)	12 / 13 (92%)

---

---

---

---

---

---

---

---

---

---

---

---

### Most Andara OFS Patients Responded

Patient	Length of Response Interval (root levels)		Motor Responder	Sensory Responder	Motor or Sensory Responder
	Motor	Sensory			
01	0	11	No	Yes	Yes
02	0	4	No	Yes	Yes
05	0	1	No	Yes	Yes
CU	0	0	No	No	No
07	0	22	No	Yes	Yes
06	0	4	No	Yes	Yes
08	0	22	No	Yes	Yes
04	1	0	Yes	No	Yes
09	5	1	Yes	Yes	Yes
10	1	7	Yes	Yes	Yes
11	0	8	No	Yes	Yes
12	1	15	Yes	Yes	Yes
13	0	22	No	Yes	Yes
Total Number of Responders			4 / 13 (31%)	11 / 13 (85%)	12 / 13 (92%)

---

---

---

---

---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---

**IMPRESSIVE CHANGE, BUT COULD THIS BE ATTRIBUTED TO SPONTANEOUS RECOVERY ALONE?**

- **Do comparative study**
  - Takes too long
  - Costs too much
  - Technology may have evolved by the time the study is finished
- **Compare to natural history data**
  - Literature reviews
  - Placebo groups of RCTs
    - NASCIS
    - Sygen

17

---

---

---

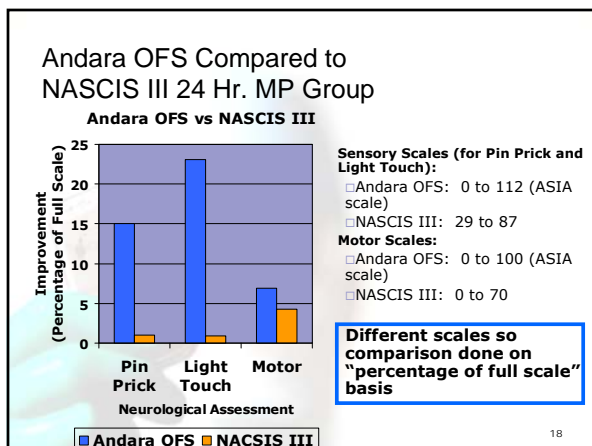
---

---

---

---

---




---

---

---

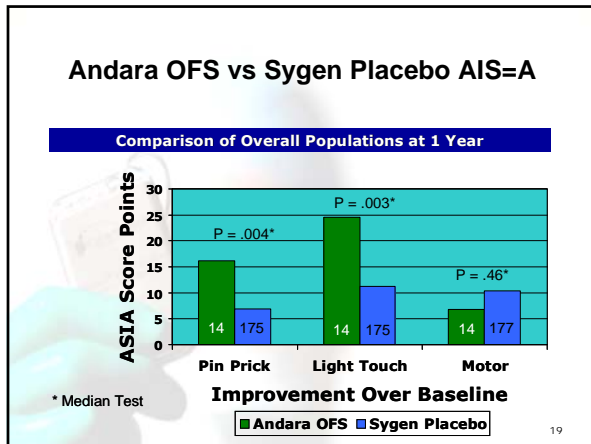
---

---

---

---

---




---

---

---

---

---

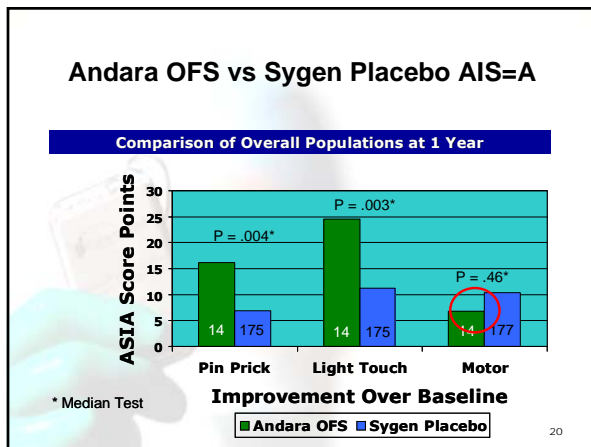
---

---

---

---

---




---

---

---

---

---

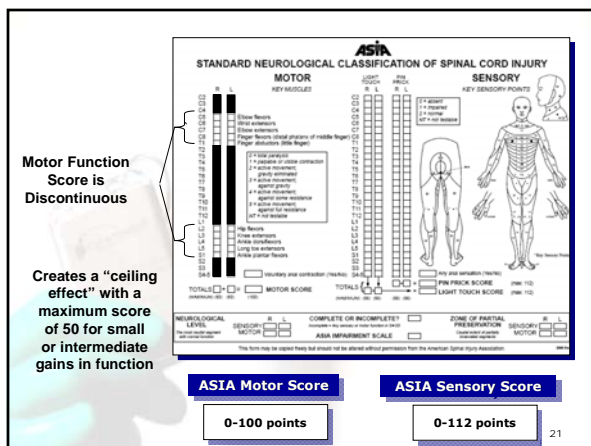
---

---

---

---

---




---

---

---

---

---

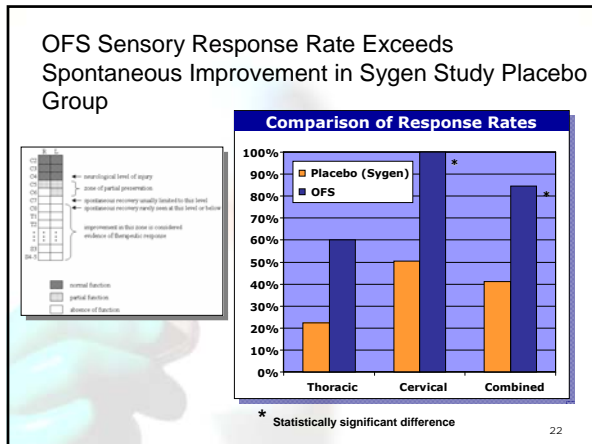
---

---

---

---

---




---

---

---

---

---

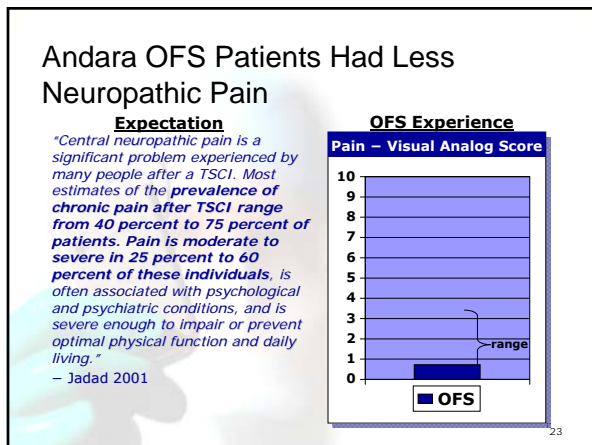
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

- ### Andara OFS Has Excellent Safety Profile
- **Skin scarring normal**
    - No unusual keloid formations or skin erosion.
  - **Internal fibrosis and scarring typical for implants**
  - **All devices and leads successfully removed.**
  - **Pain scores better than expected with injury to spinal cord, vertebrae, ligaments and muscles at the site of injury.**
    - Two week average 2.65 (0-7); 12 month average 0.73 (0-3.7)
  - **Average duration of implant procedure 120.6 minutes (60-192 mins.)**
  - **Blood loss minimal**
    - Implant average 98.2cc; explant average 41.2cc
    - No transfusions required.
  - **Infection rate 3.6%**
    - One superficial wound infection on explantation (1/28)
      - successfully treated with IV antibiotics
      - infection resolved, no sequelae

---

---

---

---

---

---

---

---

---

---

**WHERE ARE WE NOW?**

- Currently awaiting FDA approval
- Submitted under Humanitarian Device Exemption
  - Safety
  - Probable Benefit
- Must have institutional IRB approval
- To be released in 15 centers who have agreed to participation in post approval study
- Limited release outside of study on a case-by-case basis
- Once study complete, widespread unlimited release

25

---

---

---

---

---

---

---

---



Thank You

26

---

---

---

---

---

---

---

---