



The background features a detailed anatomical illustration. At the top right, a single neuron is shown with its cell body and branching processes, labeled 'Neuron'. To the left, a bundle of nerve fibers is shown, labeled 'Nerve'. At the bottom, a cross-section of a nerve is shown, with a label 'Myelin sheath' pointing to the outer layer. The central text is overlaid on this diagram.

Nerve Transfer After Spinal Cord Injury

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Incidence of SCI

- North America at 40/million
- Western Europe at 16/million
- Australia at 15/million
- Asia 21-25/million
- The Kingdom 38-62/million



How Can we help ?

- Tendon Transfer
- Nerve Transfer

Research

- Stem Cell Therapy
- Spinal Cord Bypass Surgery
- Brain – Controlled Robotics Modules

Research

- Brain – Controlled Robotics Modules



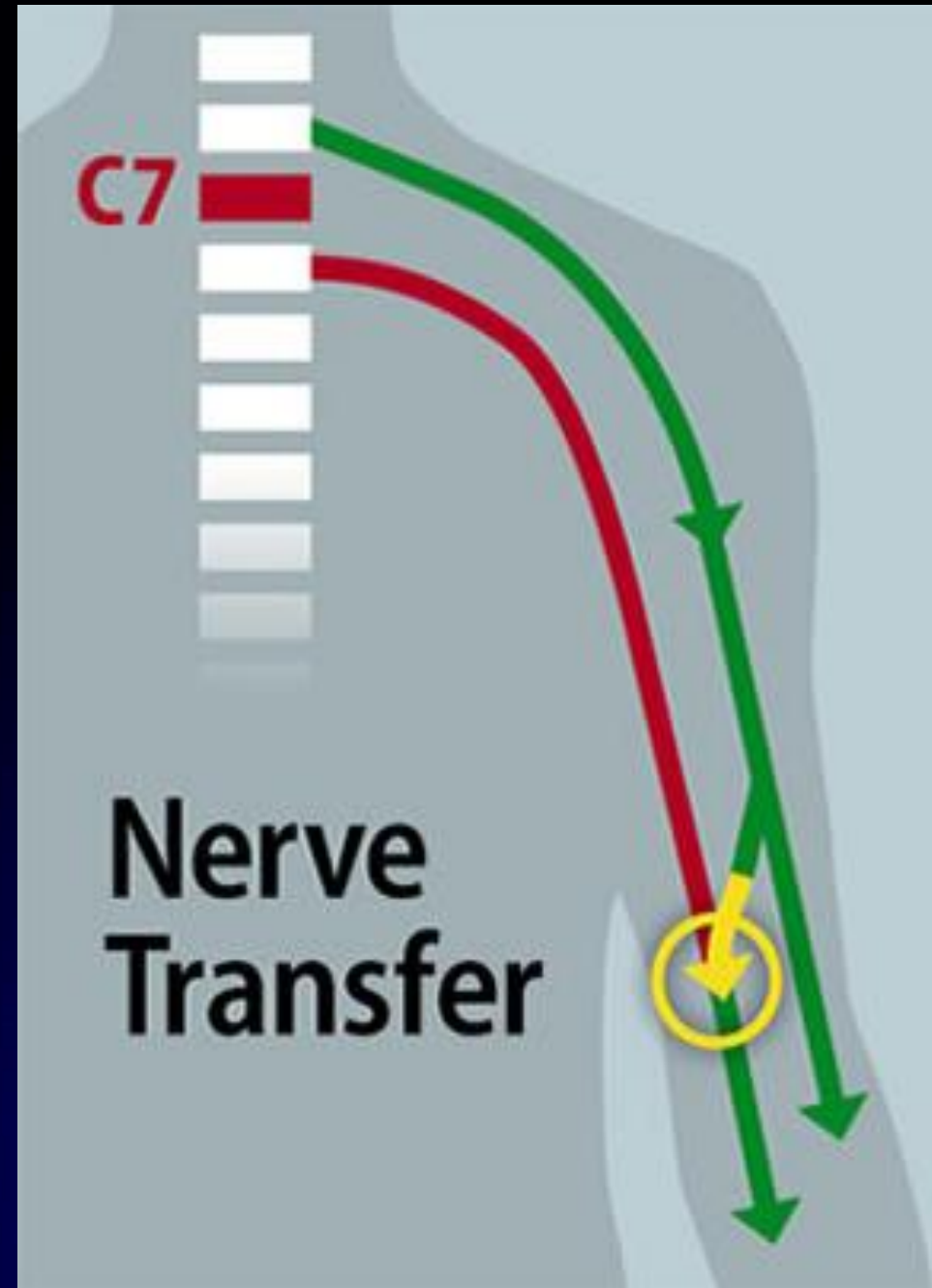
Research

- Brain – Controlled Robotics Modules



Nerve Transfer

Nerve transfer

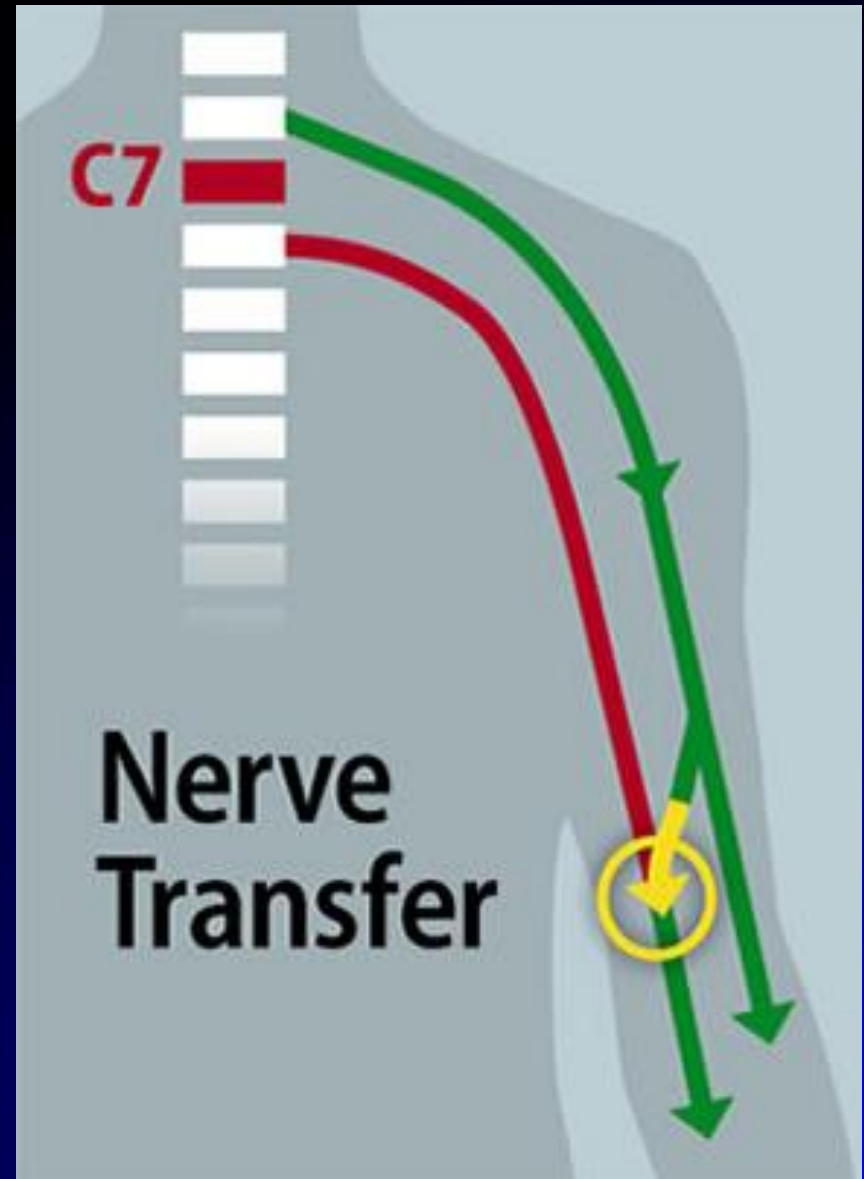


Advantages

- Shorter period of restrictive immobilization
- Minimal loss of donor muscle function
- Can be done in one single phase
- Offer a greater functional gain for a given transfer

Nerve transfer

- Zones
- Timing
- Joints
- What needs to be restored



Nerve Transfer

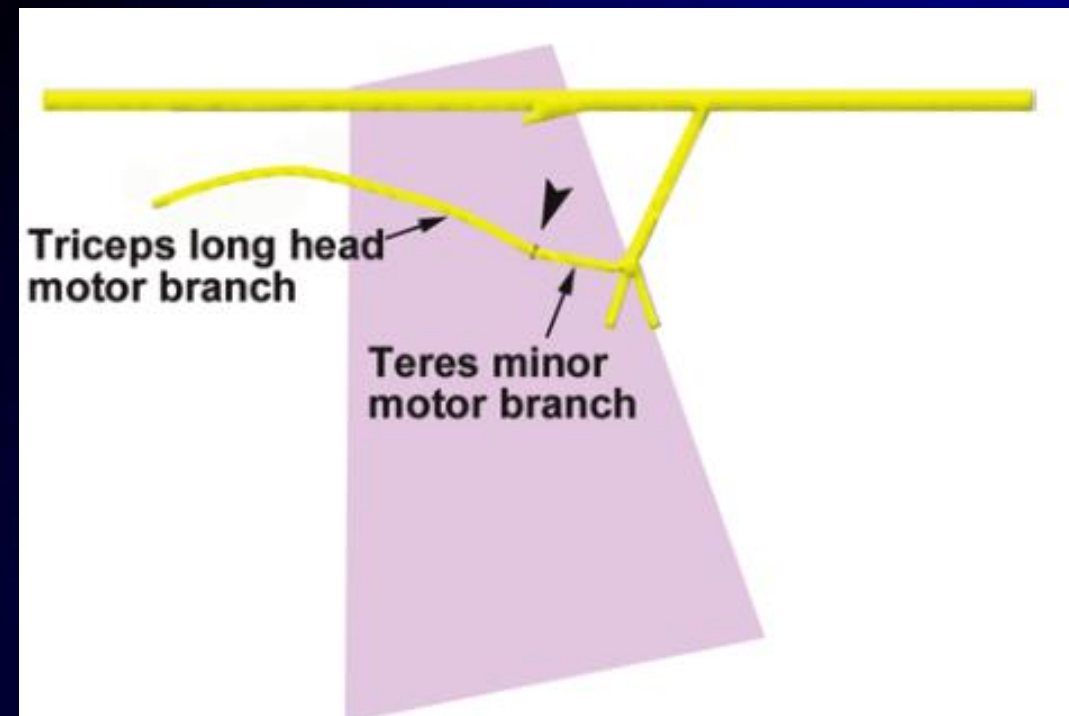
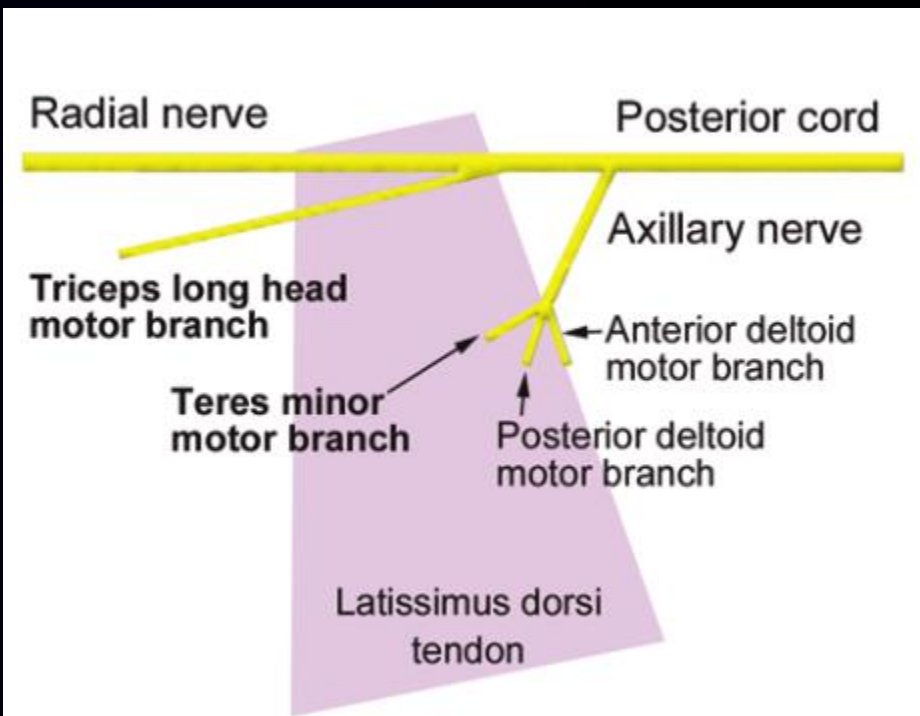
- Cervical SCI
- Thoracolumbar SCI

Nerve Transfer in Cervical SCI

- ELBOW EXTENSION
- PINCH AND GRASP
- THUMB AND FINGER EXTENSION
- DIAPHRAGM REINNERVATION

Elbow Extension

- Teres minor motor branch
- Posterior deltoid motor branch

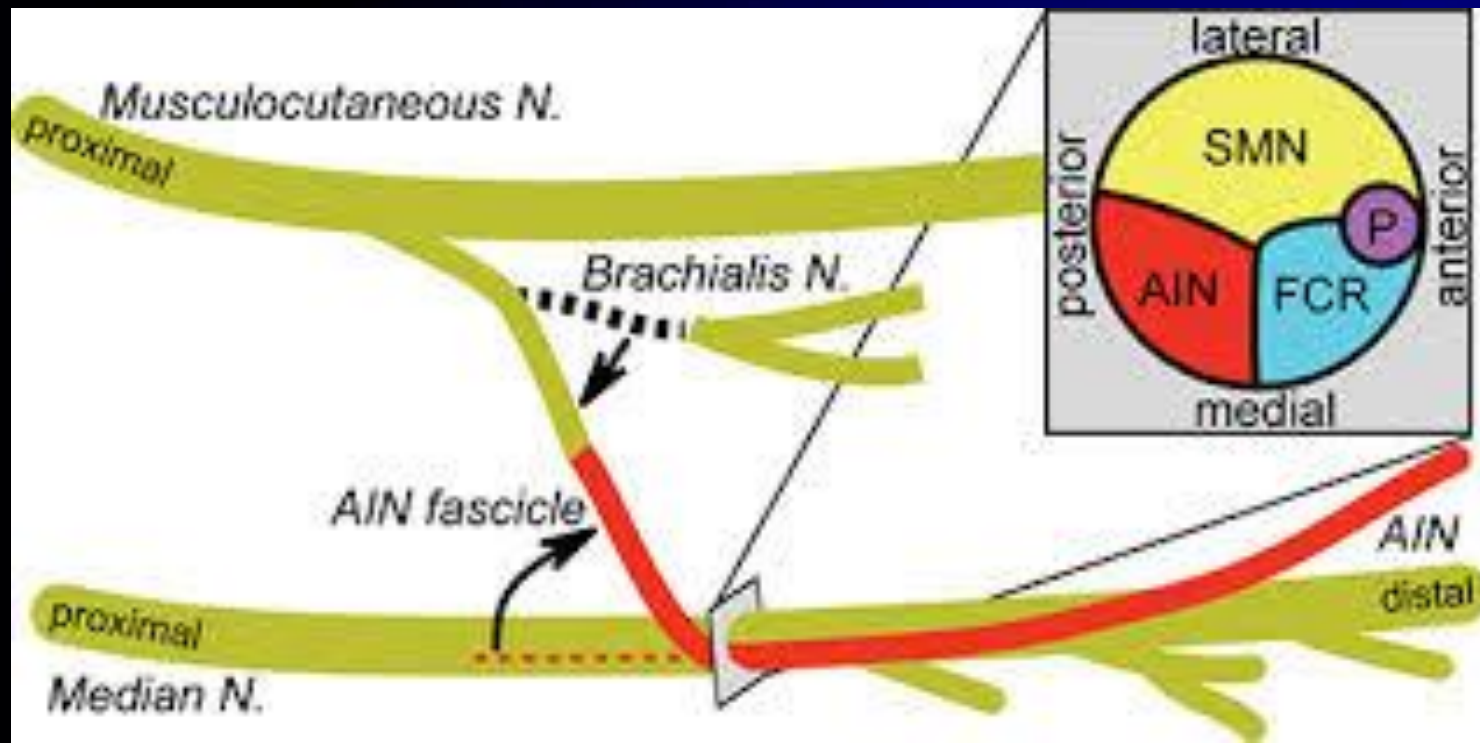


Elbow Extension

- Bertelli et al
 - 7 patients
 - 13 upper limbs
 - 7 months after a spinal cord injury
 - Elbow strength grade 4 in 11 pts

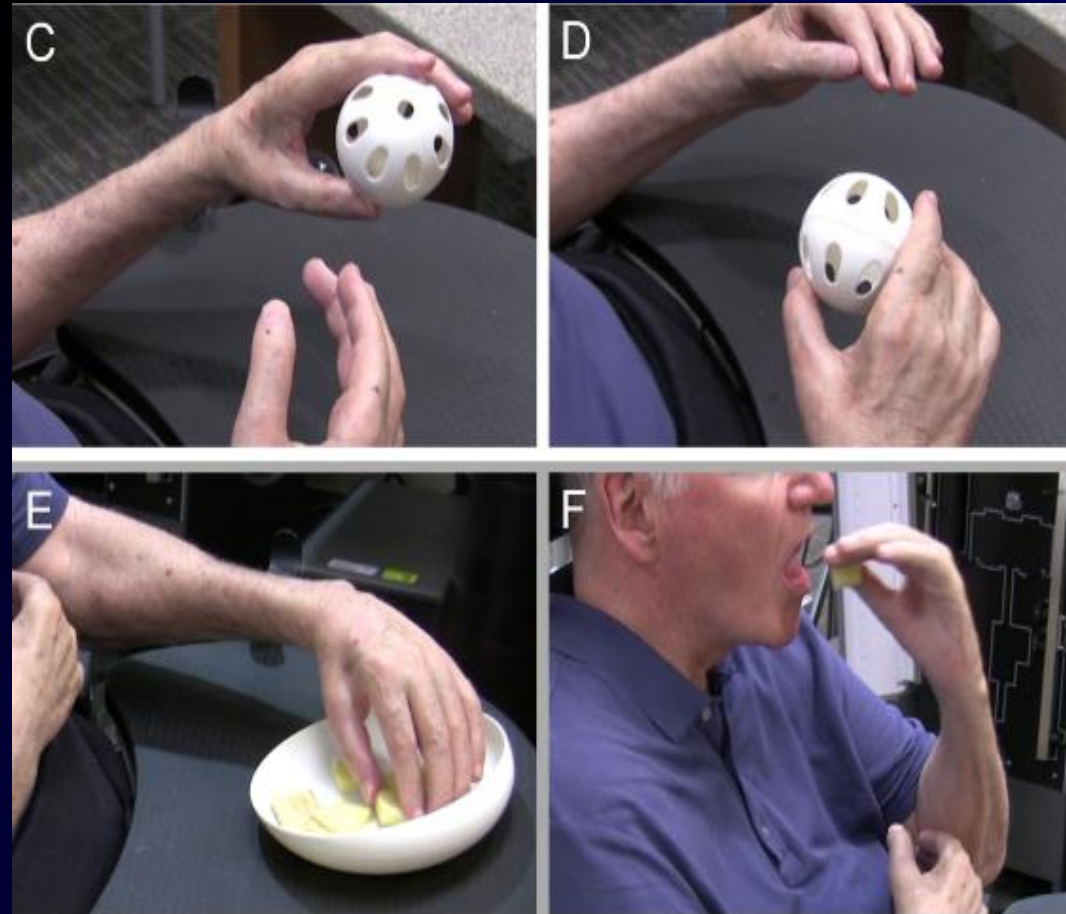
Pinch and Grasp

- Brachialis motor branch



Pinch and Grasp

- Mackinnon et al
 - Complete C7 SCI
 - 23 months after the injury
 - At 15 months after surgery



THUMB AND FINGER EXTENSION

- Bertelli et al
 - Supinator motor branches to the PIN
 - 12 pts
 - Thumb extension grade 4 in 8 pts
 - Finger extension grade 4 in 12 pts

Nerve Transfer in Paraplegic Pts

- Reinnervation of the Lower Limbs
- Bladder Reinnervation

Nerve Transfer in Paraplegic Pts

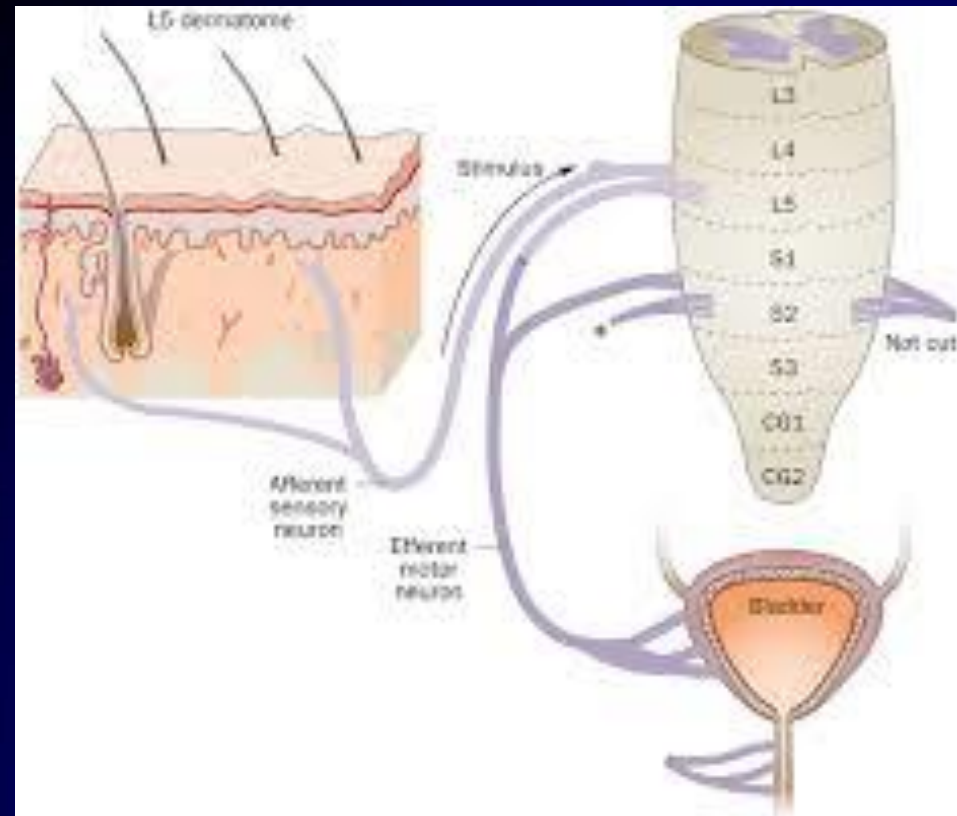
- Intercostal nerves above the level of injury
- Patil
 - single case L1/L2 fracture
 - bilateral T8 and T9 nerves to L2 and S1
 - The result was not reported

Nerve Transfer in Paraplegic Pts

- Zhang et al
 - two to four intercostal nerves
 - L1-2 or L3-4
 - ability to step forward and walk with crutches in 18 of 23 pts

For Bladder Reinnervation

- Xiao et al
 - Skin-CNS-bladder reflex
- Suprasacral SCI
- L5 VR to S2-S3 VR in 15
- Bladder function recovered in 10 of 15 pts



J Urol 170:1237-1241, 2003.

For Bladder Reinnervation

Xiao Chuanguo Fabricates and Falsifies Clinical Data

By **xysergroup** | 11月 15, 2010

Xiao Chuanguo published two papers on his clinical trials of his procedure in the Journal of Urology. Before the papers published, he also published related results in conference abstracts, articles in Chinese and other reports in Chinese. By comparing the results in the two papers with that from other sources, we demonstrate that Xiao fabricated and falsified his data.

For Bladder Reinnervation

Re: Outcomes of Lumbar to Sacral Nerve Rerouting

- Peter et al
- Nine cases
- Followed up over 1 yr
- Two patients were able to stop catheterization
- No patient achieved complete urinary continence

Conclusions

- Nerve transfer is a viable option for restoration of critical upper limb function in SCI
- Has a Questionable role for bladder reinnervation
- Further studies is needed to enhance the results