

Engineering Neuroscience & Health

Department of Biomedical Engineering

Division of Biokinesiology and Physical Therapy



Presents:

Dr. Caroline Leclercq

Institute de la Main, Paris France
caroline.leclercq@free.fr

Dr. Vincent Hentz

Stanford School of Medicine
vrhentz@stanford.edu

Monday

January 26, 2009

4:00 p.m.

Engineering challenges in the area of hand surgery

Caroline Leclercq*, MD and V.R.Hentz**, MD

*Institut de la Main, Paris, France

**Department of Hand and Upper Limb Surgery
Stanford School of Medicine, Cal

Tendon transfers are surgical procedures utilized to restore movement and ultimately function in the upper limb.

A successful procedure requires multiple knowledge in anatomy, physiology and biomechanics of the muscles, tendons and joints, and follows a few principles:

- The "donor" muscle should be strong enough (active against resistance)
- Its course to target should be as straight as possible, avoiding pulleys and changes of direction
- Its strength and excursion should match that of the "recipient" muscle
- It should be agonist of the muscle (function) to be restored
- Its tension should be set appropriately for an optimal muscle contraction

However these principles are for the most part derived empirically, as we lack reliable tools for measuring objectively such items as muscle strength, excursion, and tension. Typically the surgeon must rely on his or her experience and functional outcomes often vary between patients who have had the exact same operative procedure.

At the Rehabilitation Research and Development Center, Palo Alto VAHCS, surgeons, research therapists and bio-medical engineers have established a laboratory and have developed novel instruments to:

1. assess functional outcomes of muscle tendon transfers in tetraplegic patients
2. design strategies to optimize outcomes
3. develop new surgical procedures
4. provide the surgeon with more reliable objective methods to assist surgical decision-making.

In this presentation, we will discuss the basic principles underlying muscle-tendon transfers, identify issues where collaboration between surgeons and engineers may lead to useful advances and discuss our progress to date in this area.

Caroline Leclercq, MD
Vincent R. Hentz, MD

Locations:

Seminar is simultaneously presented

Refreshments will be served

3:00 pm - 4:00 pm

HSC: CHP 147—LIVE

Center for the Health Professional

HSC Campus Map/Directions:
<http://www.usc.edu/about/visit/hsc/>

UPC: HNB 100 – Video Conference

Hedco Neurosciences Building

UPC Campus Map/Directions:
<http://www.usc.edu/about/visit/upc/>

Organized by Professor Francisco Valero-Cuevas <http://bme.usc.edu/valero/>

Web Cast

<http://capture.usc.edu/college/Catalog/?cid=af180d48-ceff-42b9-a35c-eb199daed320>

Information about all seminars can be found at
<http://www.clmc.usc.edu/~heiko/ENH>

ENH SEMINAR SERIES