



SAPIENZA  
UNIVERSITÀ DI ROMA

# Lessons learned at the Italian Congress for the Study of Focused Shock Waves (FST)

## Medial and Lateral Epicondylitis

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*Welcomes Italy*  
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**July 1st, 7pm (Italy)**

With the participation of the orthopedic  
and traumatology services of the universities  
Sapienza, Tor Vergata, UniMoRe and Magna Graecia.



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## Lateral elbow tendinopathy (tennis elbow)

The tendon most frequently involved is the **EXTENSOR CARPI RADIALIS BREVIS (ECRB)**

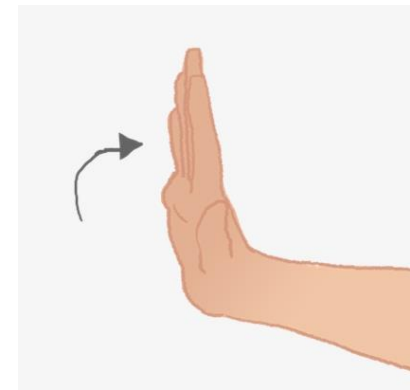
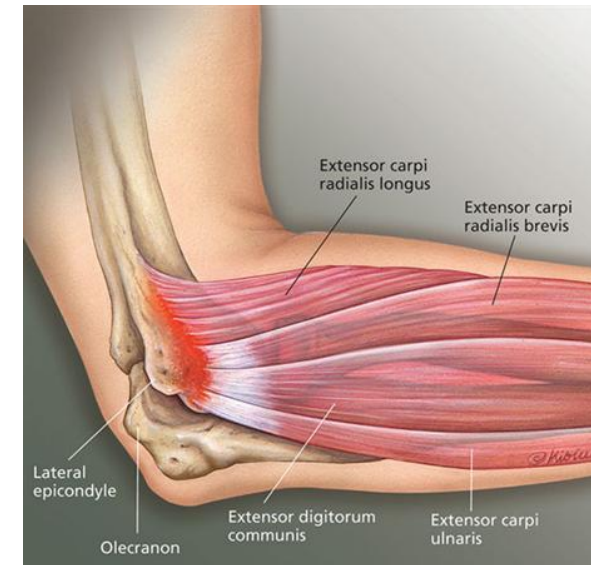
### Incidence

- Most common cause for elbow symptoms in patients with elbow pain
- Affects 1-3% of adults annually
- Commonly in dominant arm

### Demographics

- Up to 50% of all tennis players develop
- Common in laborers who utilize heavy tools
- Workers engaged in repetitive gripping or lifting tasks
- Most common between ages of 35 and 50 years old
- Men and women equally affected

**Most common cause of lateral elbow pain**



## Medial elbow tendinopathy (golfer's elbow)

The medial joint tendon is affected and the **ROUND PRONATOR** as well as the **FLEXOR RADIALIS CARPI** belong to this group of muscles.

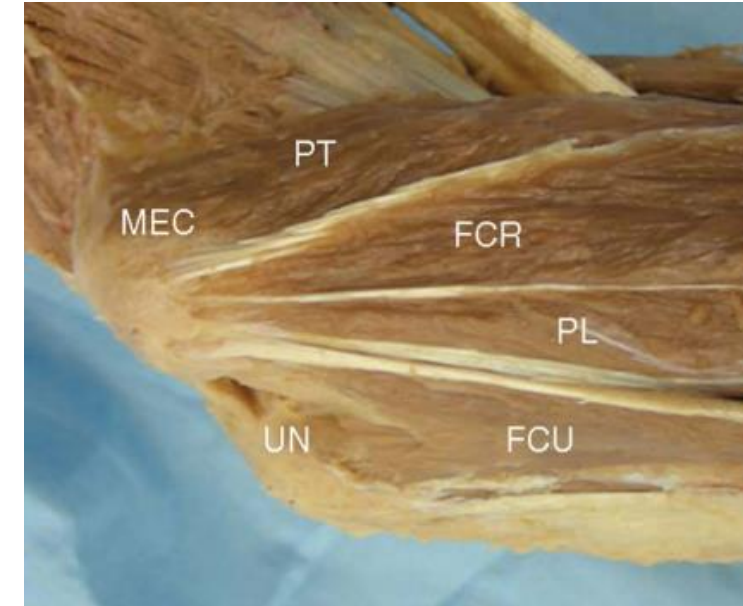
### Incidence:

- 5 to 10 times less common than lateral epicondylitis

### Demographics

- affects men and women equally
- dominant extremity in 75% of cases
- age 30s to 60s, most commonly in 30s to 40s

**Most common cause of medial elbow pain**



# Focused shock waves in musculoskeletal pathology – Epicondylitis and Epitrocleitis

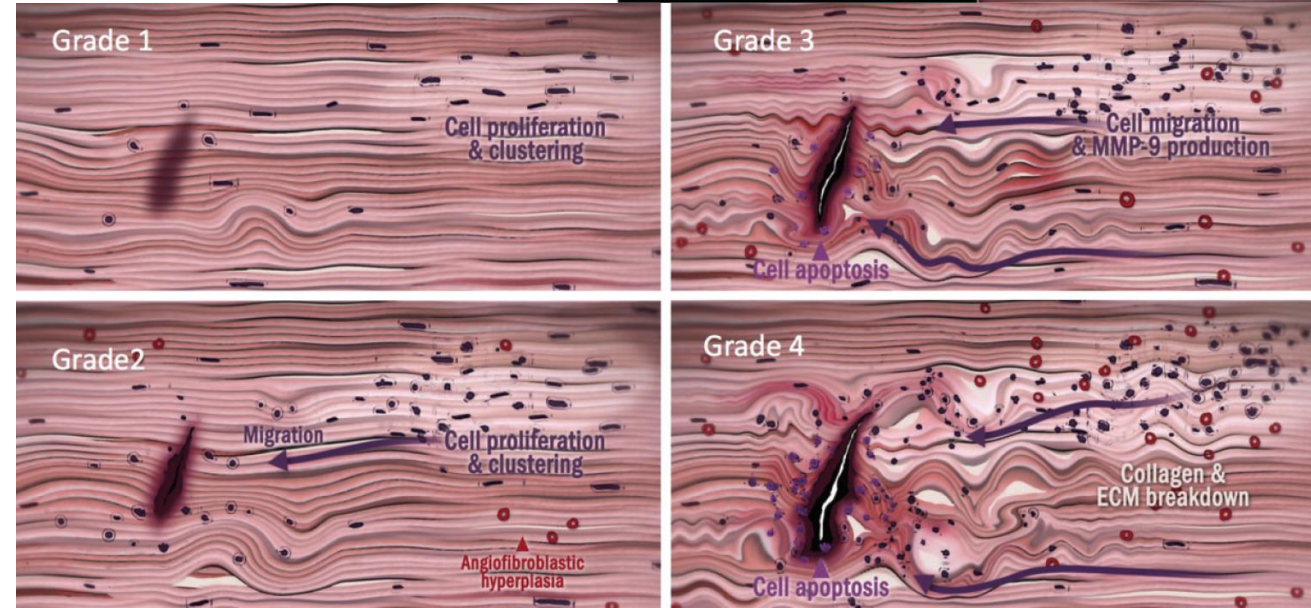
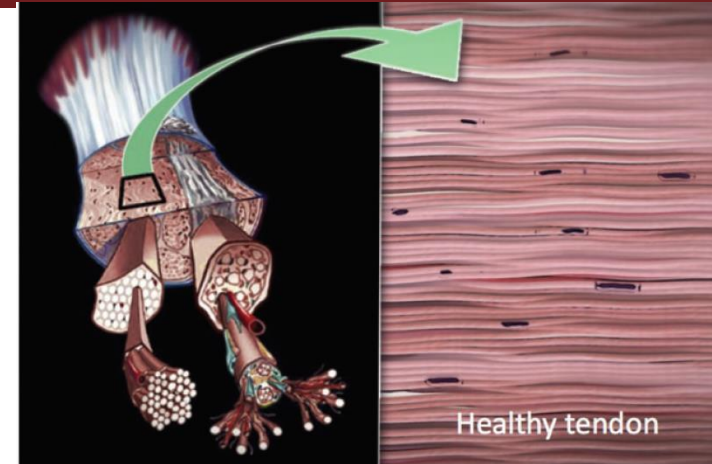
In **healthy tendon**, type 1 collagen fibers are organized and layered side-to-side and end-to-end, essentially parallel but with a very slight wave pattern. The tenocytes are elongated and uniform in number.

In **grade 1** tendinopathy, the tight array of collagen fibers loosens with increasing waviness. There is a relative increase in type 3 collagen and minimal cell proliferation.

In **grade 2** tendinopathy, there is increasing cell proliferation and clustering as well as angiogenesis. The nuclei of the cells become rounded, and the collagen fibers are further disrupted and start to fragment.

In **grade 3**, tendinopathy there is cell death by apoptosis. There is increased cell migration and matrix metalloproteinase (MMP) production. The extracellular matrix begins to breakdown until, in

In **grade 4** tendinopathy, there is structural and mechanical failure.



# Focused shock waves in musculoskeletal pathology – Epicondylitis and Epitrocleitis

## SYSTEMIC REVIEW

Clinics in Shoulder and Elbow Vol. 22, No. 4, December, 2019  
<https://doi.org/10.5397/cise.2019.22.4.227>

**CiSE**  
Clinics in Shoulder and Elbow



## Current Trends for Treating Lateral Epicondylitis

Gyeong Min Kim, Seung Jin Yoo, Sungwook Choi, Yong-Geun Park<sup>✉</sup>

Department of Orthopedic Surgery, Jeju National University Hospital, Jeju National University School of Medicine, Jeju, Korea

2019

### Conservative/non operative:

- Rest
- Cryotherapy
- Brace
- NSAIDs
- Physiotherapy
- Injection therapy (corticosteroids, botulinum toxin and PrP/growth factors)
- Ultrasound therapy
- **Extracorporeal shock wave therapy (ECSW)**

## OPEN Research Article

## Trends in Corticosteroid Injections for Treatment of Lateral Epicondylitis: An Analysis of 80,169 Patients

John Q. Sun, BS   
Quinn A. Stillson, BS   
Jason A. Strelzow, MD   
Lewis L. Shi, MD

2021

**Table 1. Treatment Modalities for Lateral Epicondylitis**

Modality	N (%)
Corticosteroid injection	16,479 (20.6)
Physical therapy	12,180 (15.2)
Bracing treatment	1,874 (2.3)
Surgery	2452 (3.1)
Total patients	80,169

### Invasive:

- ECRB release
- Resection of the tendinosis portion of the affected tendon via different approaches (arthroscopic/open)

## Shockwave therapy vs CCS injections

Shock-wave therapy versus corticosteroid injection on lateral epicondylitis: a meta-analysis of randomized controlled trials

2019

Yuan Xiong, Hang Xue, Wu Zhou, Yun Sun, Yi Liu, Qipeng Wu, Jing Liu, Liangcong Hu, Adriana C. Panayi, Lang Chen, Chenchen Yan, Bobin Mi & Guohui Liu

**Both SW and CS** in relieving pain and improving self-reported function in the treatment of LE.

**When follow-up is longer than 12 weeks, better improvement** in the terms of VAS and grip strength can be found in **SW group**, and we assume SW can be a better alternative for the management of LE

## Shock-wave therapy vs Ultrasonics

Yan et al. *Journal of Orthopaedic Surgery and Research* (2019) 14:248  
<https://doi.org/10.1186/s13018-019-1290-y>

Journal of Orthopaedic  
Surgery and Research

SYSTEMATIC REVIEW

Open Access

2019

A comparative study of the efficacy of ultrasonics and extracorporeal shock wave in the treatment of tennis elbow: a meta-analysis of randomized controlled trials



Chenchen Yan<sup>1</sup>, Yuan Xiong<sup>1</sup>, Lang Chen<sup>1</sup>, Yori Endo<sup>2</sup>, Liangcong Hu<sup>1</sup>, Mengfei Liu<sup>1</sup>, Jing Liu<sup>1</sup>, Hang Xue<sup>1</sup>, Abudula Abududilibaier<sup>1</sup>, Bobin Mi<sup>1\*</sup> and Guohui Liu<sup>1\*</sup>

- No significant difference in the elbow function evaluation scores between ESWT and US,
- The superiority of the ESWT group in the **VAS of pain** (both at 1 month, 3 months, and 6 months follow-ups) raised **grip strength** in ESWT group
- **ESWT offers more effective therapy** for lateral epicondylitis than US therapy.

## Shockwave therapy vs Laser therapy



ACTA ORTHOPAEDICA et TRAUMATOLOGICA TURCICA

[www.aott.org.tr](http://www.aott.org.tr)

Research Article

2020

### Comparison of low level laser therapy and extracorporeal shock wave in treatment of chronic lateral epicondylitis

Türkan Turgay<sup>1,2</sup> , Pinar Günel Karadeniz<sup>3</sup> , Gökhan Bülent Sever<sup>4</sup> 

- Evidence from this study revealed that although **both treatment modalities** were **effective** in the treatment of CLE
- ESWT seemed to **more effective** in **pain relief and functional recovery** than LLLT.



## METHODS

### INCLUSION CRITERIA:

- Acute/chronic pain
- Tenderness at the medial/lateral epicondyle
- + specific tests
- Absence of specific contraindications for ESWT
- Not responsive to previous rehabilitation treatments

### EXCLUSION CRITERIA:

- Inflammatory arthropathy
- Pregnancy
- Age < to 18 years
- Arthrosis
- Infections
- Neoplastic pathologies
- Coagulopathies/treatment with antiplatelet agents
- Microinstability
- Loose bodies
- PIN/ulnar entrapment
- Synovial plica
- Panner's disease

## METHODS



- Submission of specific questionnaires:

**DASH score**

**Mayo Elbow Performance Score**

- Evaluation of the VAS scale and of the range of motion
- Clinical evaluation through specific tests for epitrocleitis and epicondylitis

- Before starting treatment (T0)
- At follow-up (2, 6 and 12 months)

## Mayo Elbow Performance Score (1993):

- Pain (45 pts)
- Range of motion (20 pts)
- Stability (10 pts)
- Daily function (25 pts)

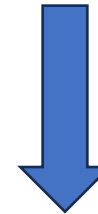
The Mayo Elbow Score is 0



Higher the score → better conditions

## DASH score (1996):

- 38 questions divided in 3 sessions:
  1. Activities of daily living
  2. Work-related activities
  3. Sport-related activities



Higher the scores → worst conditions

# Focused shock waves in musculoskeletal pathology – Epicondylitis and Epitrocleitis

## SPECIFIC CLINICAL TESTS



### COZEN's Test

Radial deviation; elbow flexed  
A-R wrist extension



### MAUDSLEY's Test

A-R Long finger extension



### MILL's Test

Passive wrist flexion from flexed to  
extended elbow

## Therapeutic protocol

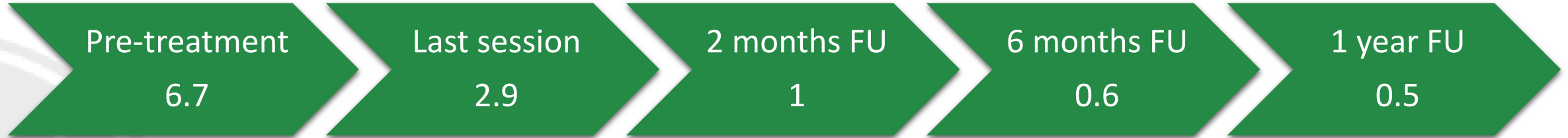
- N° of sessions: variable (minimum 5 sessions, once a week) and repeatable in the following months
- N° pulses: 3000 pulses per session
- Frequency: 5 Hz
- Duration of each session: 10 minuti
- Energy level: variable (to patient tolerance), 11 to 20 millijoules

## RESULTS

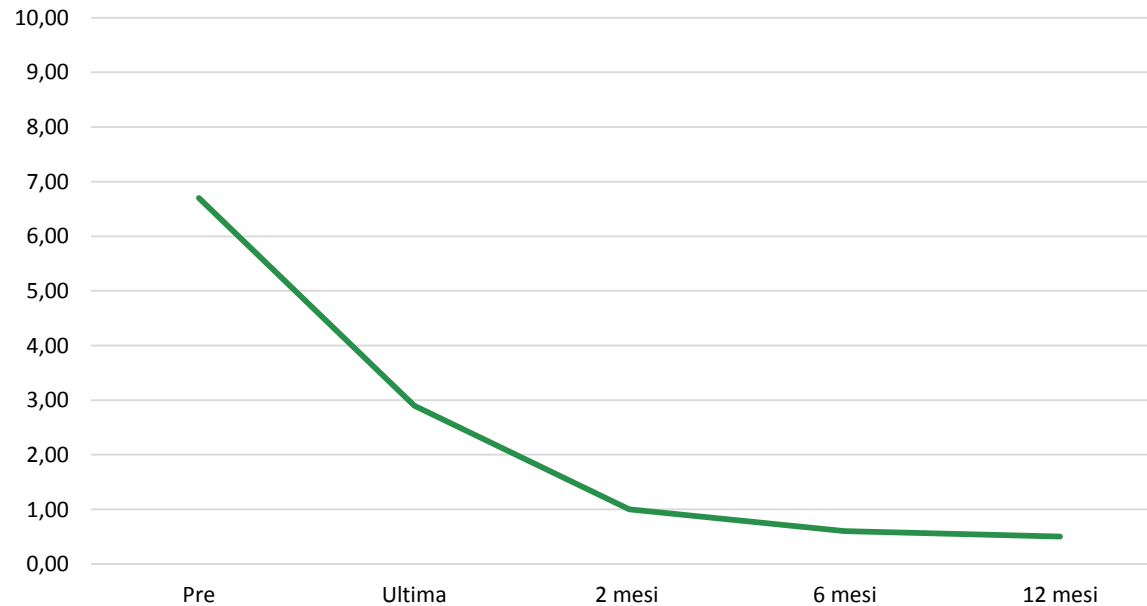
### 70 patients:

- **Mean age** 50 years old (range 20 – 67 years)
- 44 males e 26 females → **M:F = 1.7**
- **Affected side:**
  - Right 77%
  - Left 20%
  - Bilateral 3%
- **27% previous** history of epicondylitis/epitrocleitis → 1 case of recurrence after open surgical treatment
- **Level of sport activity:**
  - 28.5% sedentary
  - 25.7% low level
  - **32.8% mid-level**
  - **12.8% high level**
- 38% performed pre, but not post, instrumental examinations

## RESULTS - VAS



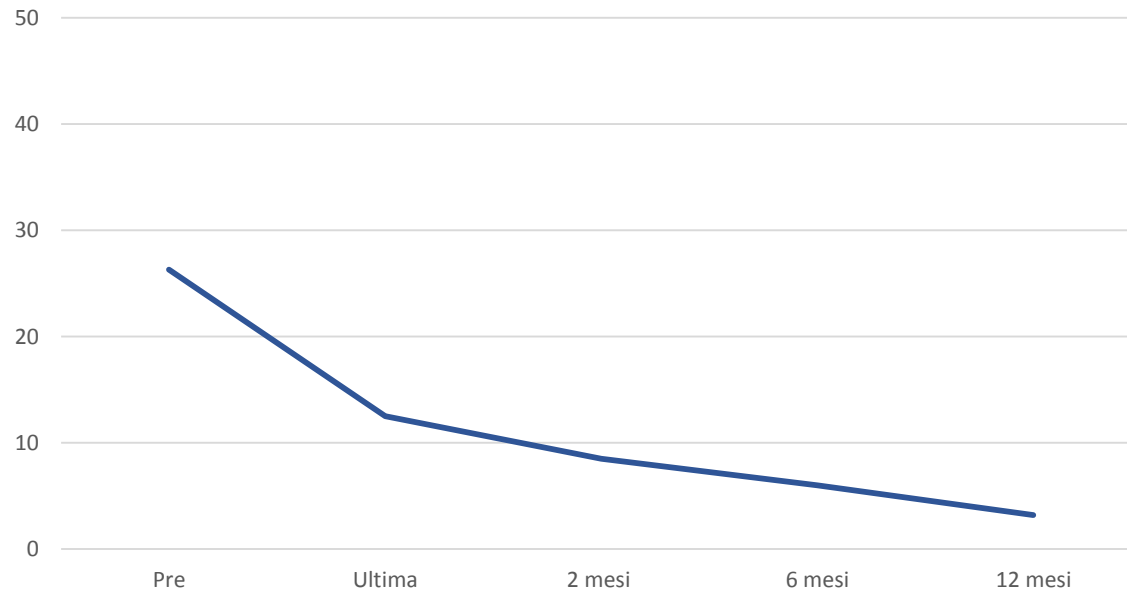
Mean VAS



## RESULTS - DASH Score

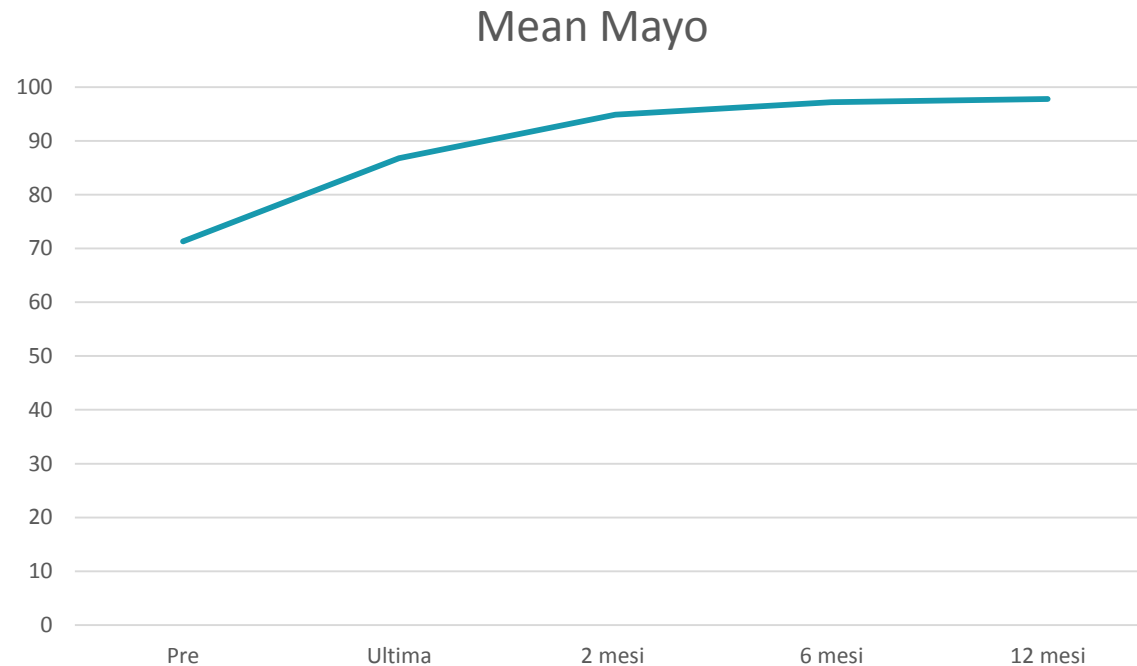
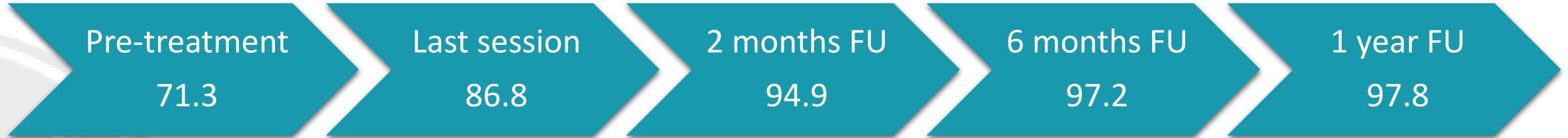


Mean DASH





## RESULTS - Mayo Score





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## THANK YOU!



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