

# ARE THERE DIFFERENCES IN MOST FREQUENTLY INJECTED MUSCLES IN UPPER, LOWER AND UPPER + LOWER LIMBS, REGARDING THE TREATMENT GOAL AREAS?

## AN OVERVIEW OF REAL-LIFE CLINICAL PRACTICE IN A REFERENCE SPASTICITY CLINIC

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### INTRODUCTION

Spasticity, a component of the upper motor neuron syndrome, is a functionally limiting disorder that may evolve in the post-stroke period. It is associated with an incidence rate of ~19% within 3 months of the ictus and >33% within 12 months. Despite this, effective spasticity management is often challenging for the clinicians/carers/patients. Botulinum toxin type A (BoNTA) is the first line pharmacological treatment for focal, multifocal and regional post-stroke spasticity with a high efficacy and safety profile. Although the early treatment of spasticity with BoNTA has been shown to improve associated reactions, reduce predetermined disability parameters (including pain), reduce caregiver burden, and improve person-centered goals and self-reported efficacy, BoNTA might be used for treatment of post-stroke spasticity in different stages of the disease with proved benefits to the patients., as measured by patient-centered goal achievement.

### OBJECTIVES

The objective of this study was to describe the possible influence of individual treatment goals in the choice of muscles to treat with BoNTA when aiming for upper limb only (UL), lower limb only (LL), or UL+LL in poststroke spasticity.

### MATERIAL AND METHODS

The data from all patients treated in our Botulinum Toxin Clinic in the year of 2014 were prospectively collected in a custom instrument specifically designed to register and to evaluate BoNTA treatments in our neurologic outpatients. In this instrument we have collected patients' clinical and epidemiological data, spasticity characteristics and patterns, BoNTA formulations and doses, SMART goal defined according to the needs/expectations of patients and caregivers, as well as goal achievement measured by GAS.

Data from all BoNTA treatment sessions between 2001 to 2016 were retrieved from clinical files.

We investigated the frequency of injected muscles for UL only, LL only and UL+LL, and also the selected frequency of injection (>50%). Treatment goals were classified using the tool Goal Attainment Scaling - Evaluation of Outcome for Upper Limb Spasticity.

### DEMOGRAPHICS

There were a total of 1056 botulinum toxin treatment sessions. Mean age at stroke was 54 years (standard deviation [SD] 12.37) and mean interval stroke-first BoNTA injection was 1.6 years. Impairment was left hemiparesis in 43.59% and right hemiparesis in 54.7%. The mean number treatment sessions was 9 (SD 6; 1-26) and the mean follow-up time was 4.18 years (SD 3.35; 0-13.59). Most frequently, the patients had both limbs treated (63%), UL only in 28% and LL only in 9%. The mean number of injected muscles were 10 (3-18; SD3) for UL+LL patients, 6 (2-13; SD1.93) for UL and 5 (2-11; SD1.81) for LL.

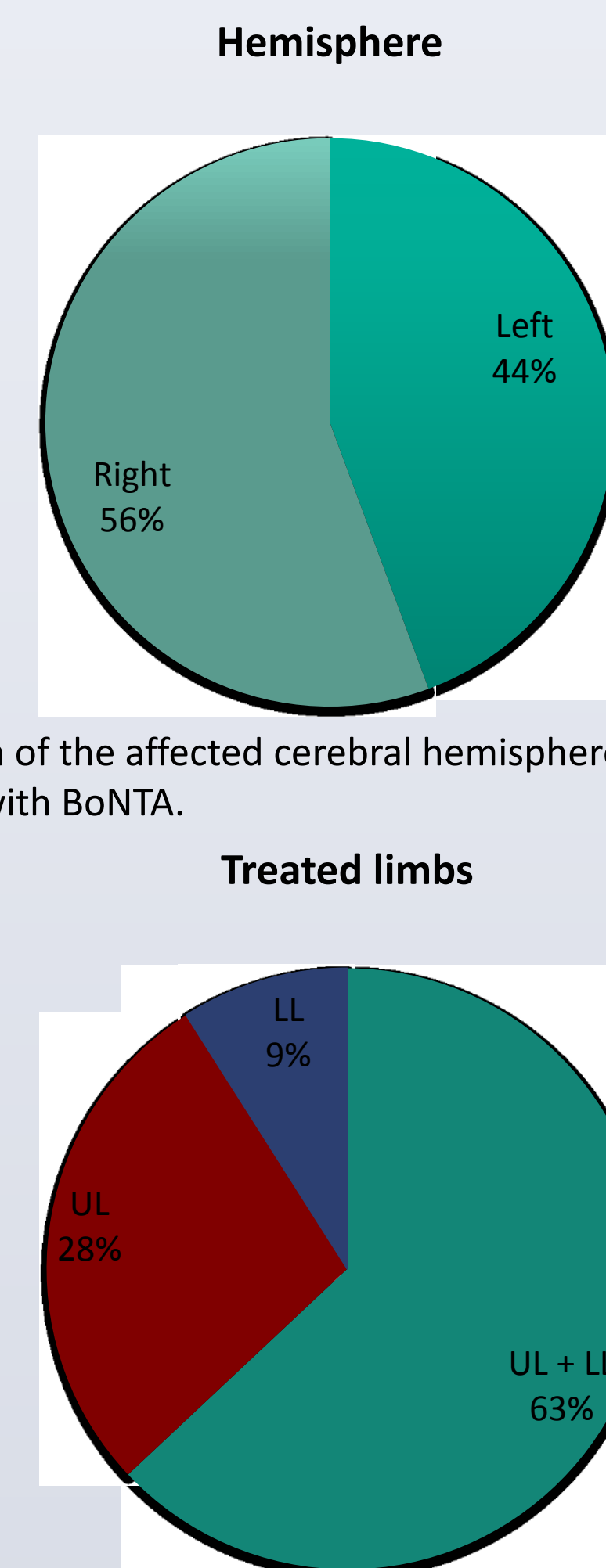


Figure 1: Distribution of the affected cerebral hemisphere in our stroke population treated with BoNTA.

Figure 2: Frequency of muscle injection according to the limb treated in each BoNTA session in our stroke population.

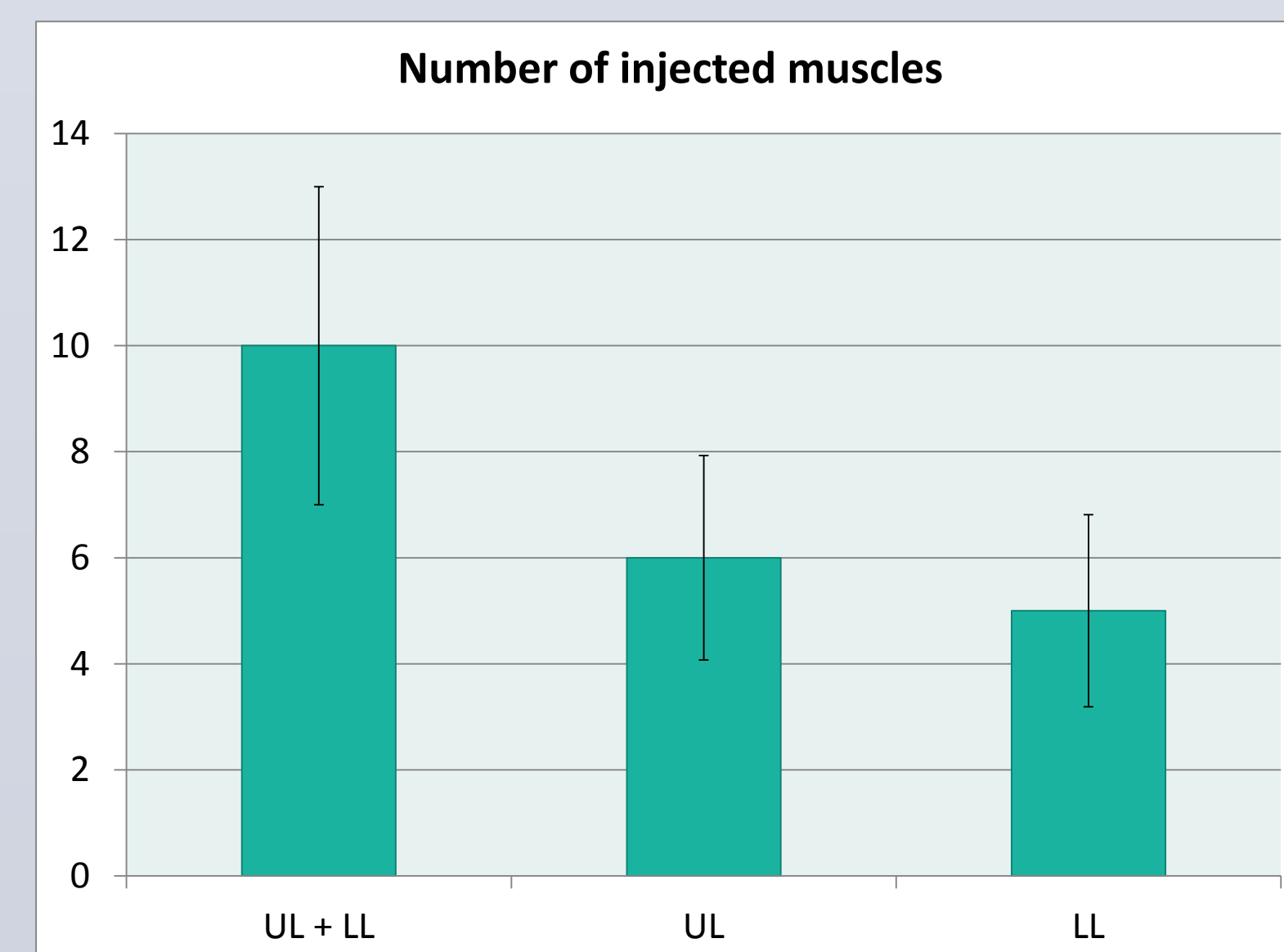


Figure 3: Mean number of treated muscles according to the site of injection in each BoNTA session in our stroke population.

### RESULTS

When only UL was treated and the primary goal was related to impairment/symptoms the most frequently injected muscles were flexor digitorum superficialis (FDS), biceps brachii (BB), flexor digitorum profundus (FDP), and subscapularis.

When the primary goal was activity/function the most injected muscles were FDS, pronator teres (PT), BB, FDP and flexor carpi radialis (FCR).

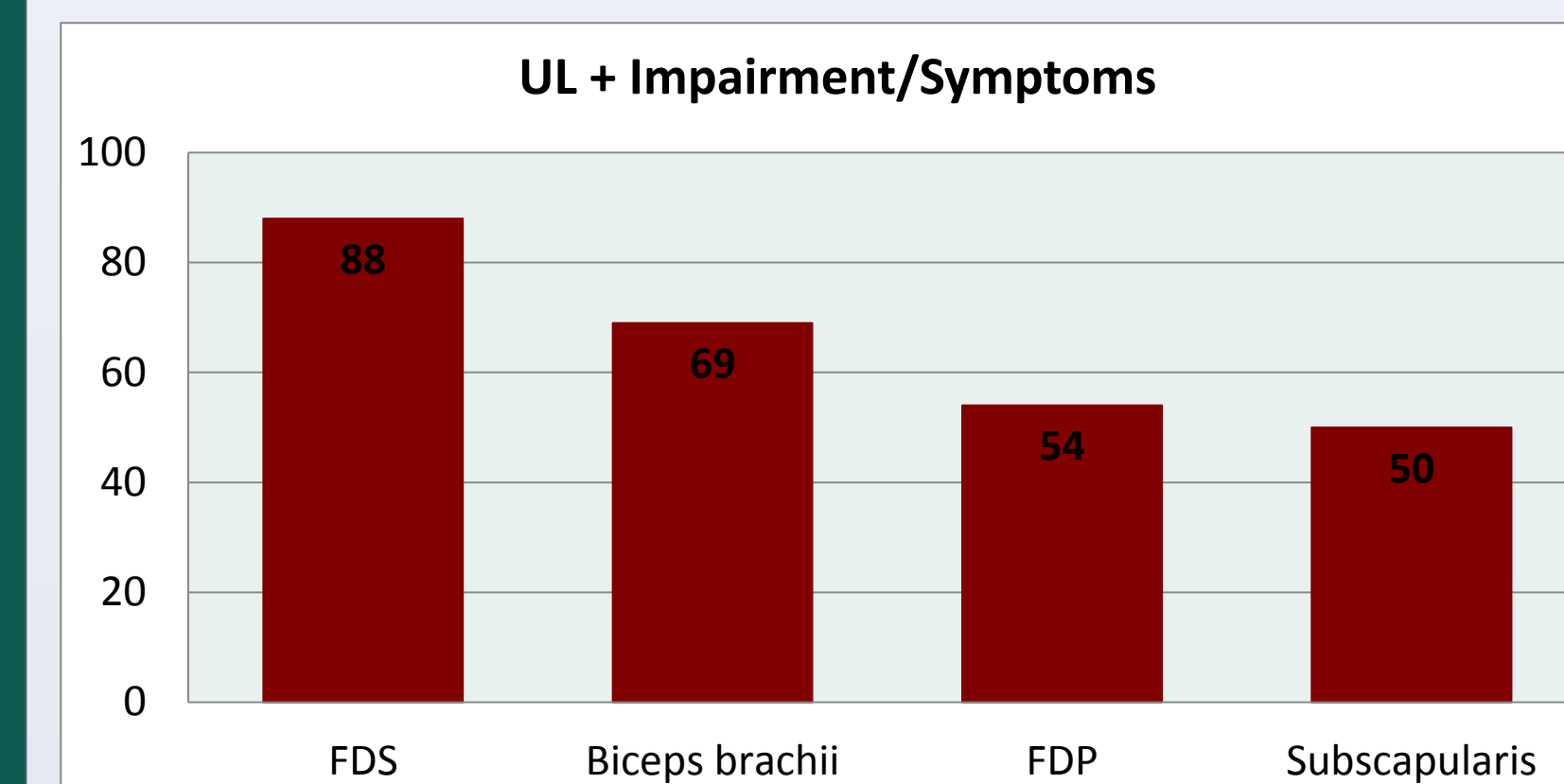


Figure 4: Frequency of injection of the most commonly treated muscles of the upper-limb when the primary goal of treatment was related to Impairment/Symptoms.

FDS: flexor digitorum superficialis; FDP: flexor digitorum profundus

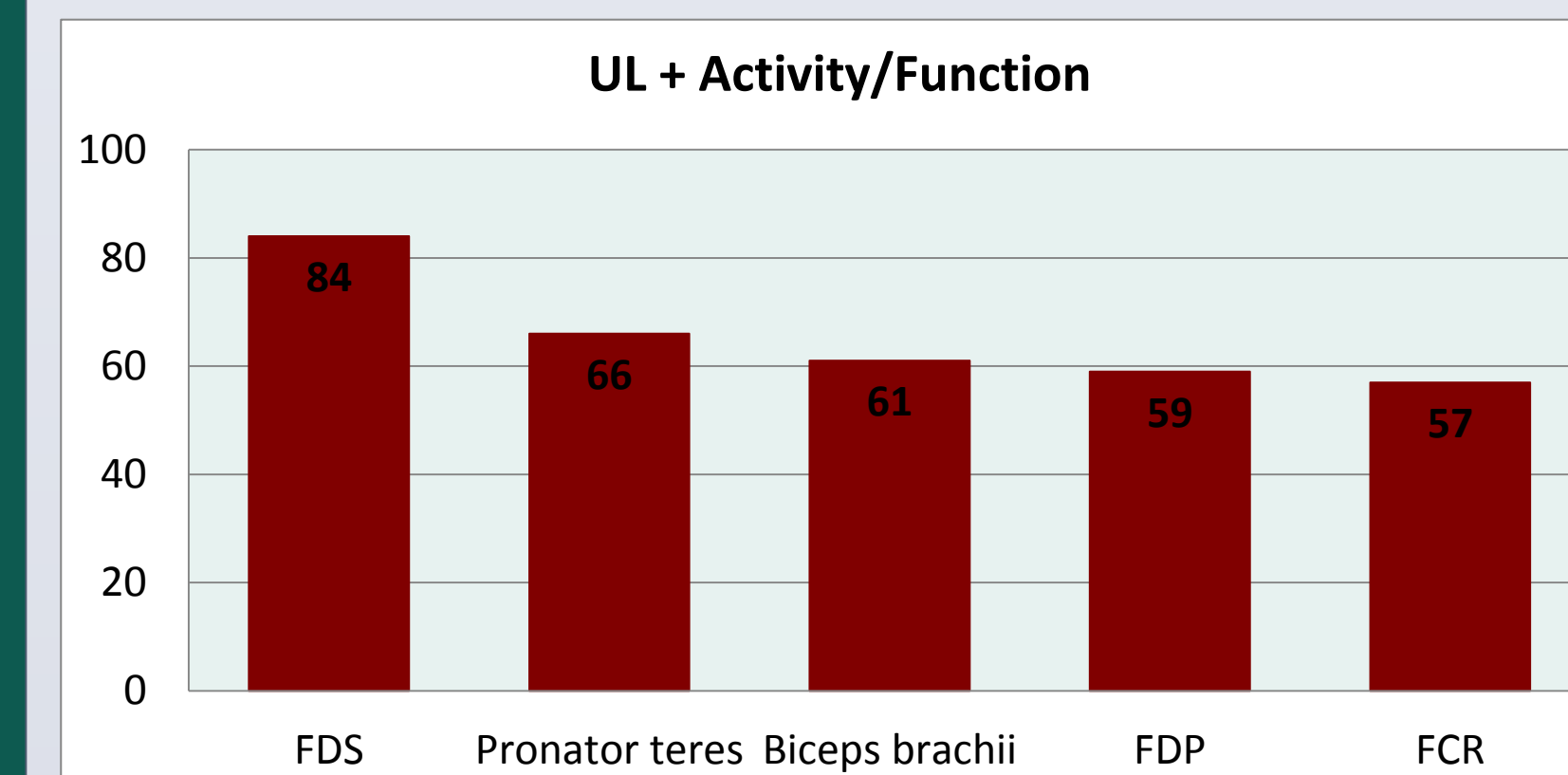


Figure 5: Frequency of injection of the most commonly treated muscles of the upper-limb when the primary goal of treatment was related to Activity/Function.

FDS: flexor digitorum superficialis; FDP: flexor digitorum profundus; FCR: flexor carpi radialis

For those treated only in the LL, and for whom the primary goal was I/S, the most frequent muscles were gastrocnemius (GN) and rectus femoris. But when it was A/F, the most frequent muscles were GN and soleus (SOL).

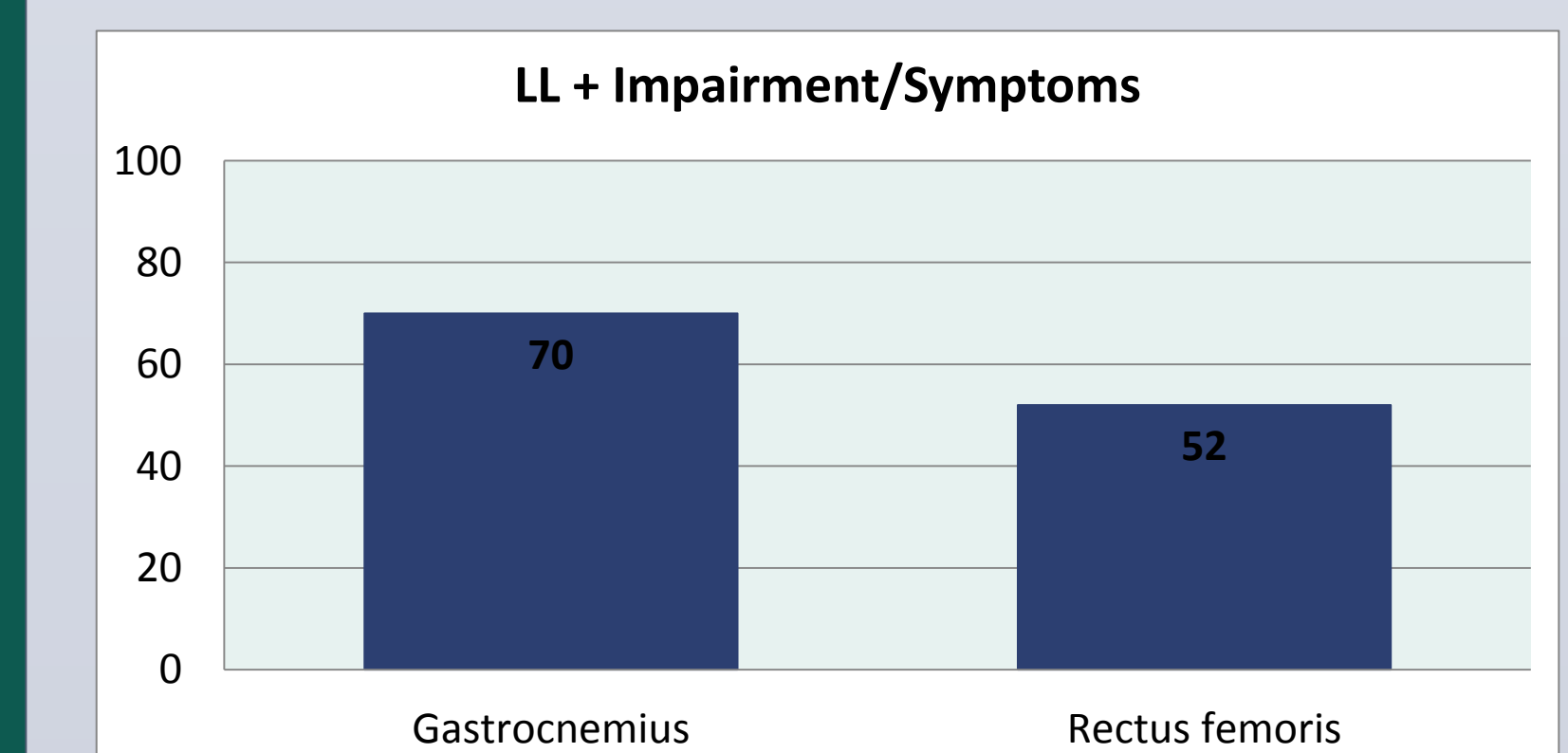


Figure 6: Frequency of injection of the most commonly treated muscles of the lower-limb when the primary goal of treatment was related to Impairment/Symptoms.

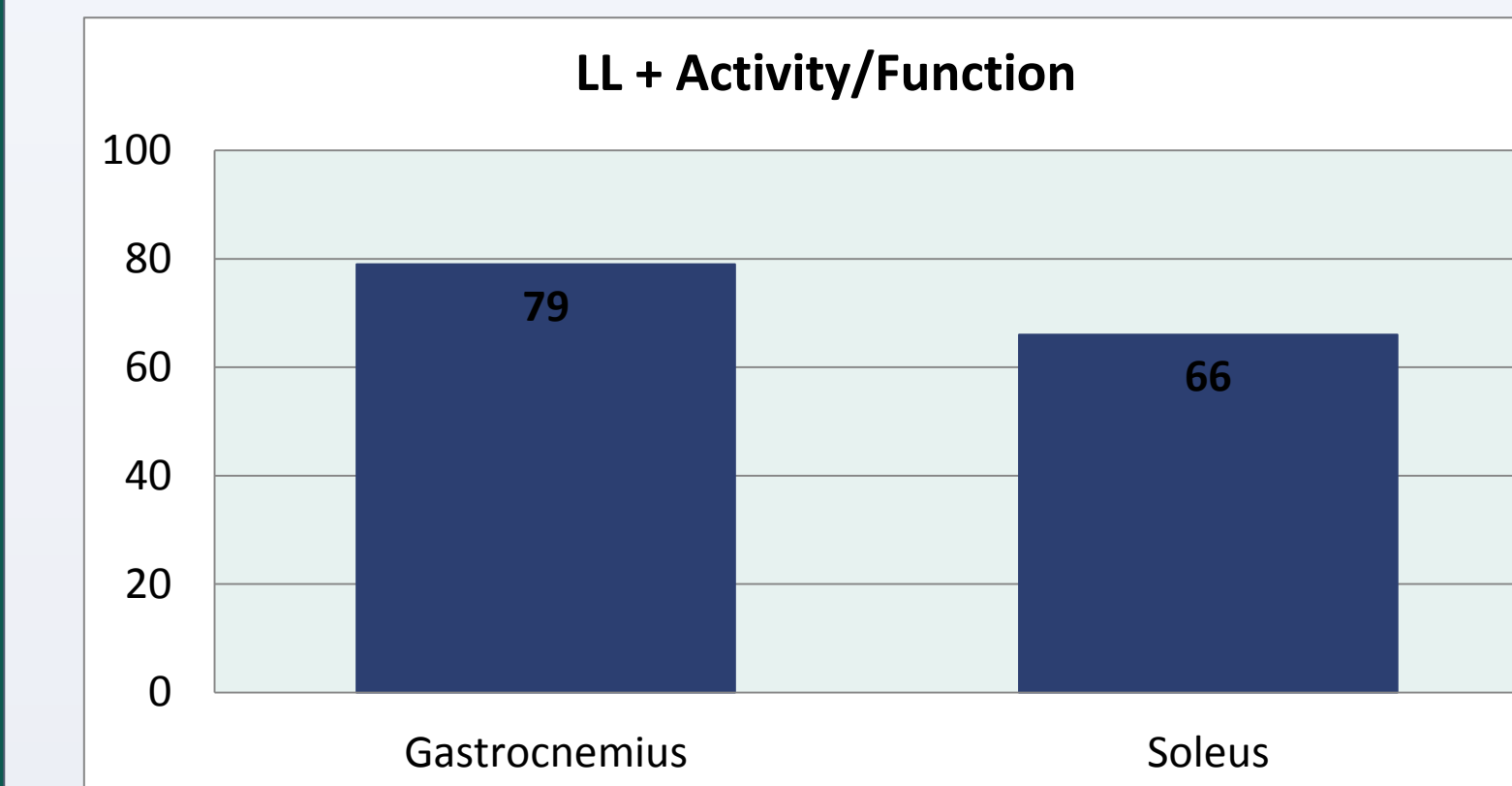


Figure 7: Frequency of injection of the most commonly treated muscles of the lower-limb when the primary goal of treatment was related to Activity/Function.

For the majority of patients who received BoNTA injections in the UL and LL, when the primary goal was I/S, the most frequent muscles were GN, FDS, BB, SOL and FDP. But, when it was A/F the most frequent muscles were GN, FDS, SOL, BB and FDP.

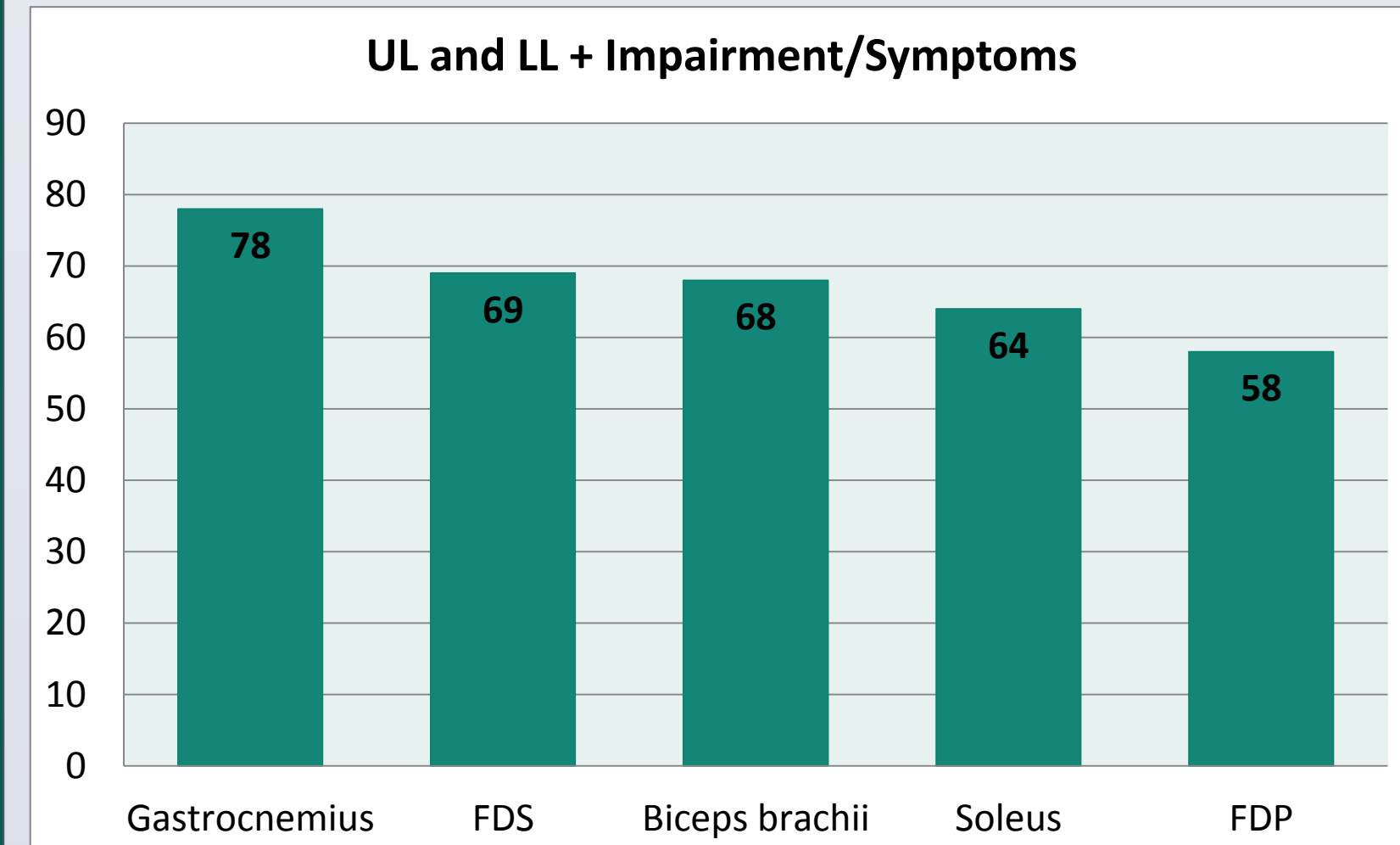


Figure 8: Frequency of injection of the most commonly treated muscles when both limbs were treated and when the primary goal of treatment was related to Impairment/Symptoms.

FDS: flexor digitorum superficialis; FDP: flexor digitorum profundus

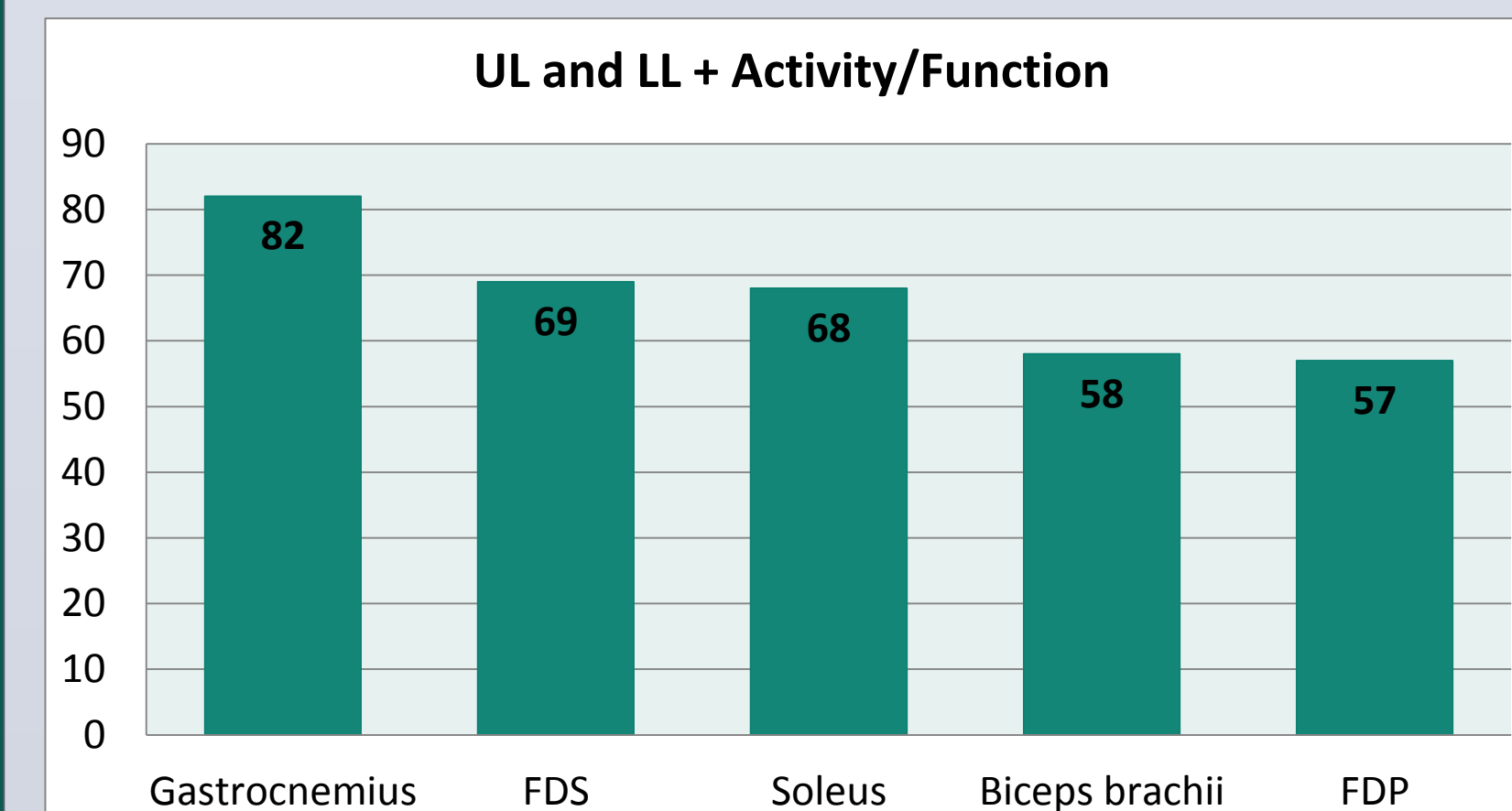


Figure 9: Frequency of injection of the most commonly treated muscles when both limbs were treated and when the primary goal of treatment was related to Activity/Function.

FDS: flexor digitorum superficialis; FDP: flexor digitorum profundus

### CONCLUSIONS

Most patients (63%) were treated in UL+LL (being hemiplegics).

Primary treatment goal areas influenced the most frequently injected muscles, when treating UL only, LL only, or UL+LL.

Unsurprisingly, the number of muscles treated varied when we treated UL only, LL only or UL+LL.

On the other hand, muscles injected for each goal domain differed, whether patients were treated for UL only, LL only, but not when treated for UL + LL, which we intend to study further, namely by looking at the frequencies lower than 50%.

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