# Wrist effort – Protocol used to record data from Myo sEMG

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## Myo Armband placement

We want evaluate the muscular activation during human wrist natural movements. The posture taken into consideration are the following: neutral, flexion and extension.



According to <<*CÔTÉ-ALLARD, Ulysse, et al. Deep learning for electromyographic hand gesture signal classification using transfer learning. IEEE transactions on neural systems and rehabilitation engineering, 2019, 27.4: 760-771>>.*

We placed the Myo Armband as follows: tightened to the right end of each participants until it matches the maximum circumference of the user’s forearm. The orientation was such that the blue light bar on the Myo was facing towards the hand of the subject.



The raw sEMG data of the Myo is what is made available with this dataset.

We tested 12 participants (8 male and 4 female), all right handed and aged between 25-35 y.

We do different test (6 in total) divide as follow:

1. Trial 1 🡪 we measured Maximum Voluntary Contraction (MVC) during flexion and extension while pressing against a box holding the harm horizontal and parallel to the ground
2. Trial 2 🡪 we measured muscular activity in isostatic position (neutral, flexion and extension).
3. Trial 3 🡪 we measured the muscular activation during a dynamic task moving from neutral to flexion and extension without any weight.

In the next page we describe the test in detail.

## 1st Trial: MVC task

To **test MVC** during flexion we asked participants to do the following task

* Stay T = 5 s -🡪 stay relaxed in neutral position;
* Then press T=5s 🡪 against a box with the palm of the hand trying to reach flexion position;
* Then release T=5s 🡪 stay relaxed in neutral position.

To test MVC during extension we asked participants to do the following task:

* Stay T = 5 s -🡪 stay relaxed in neutral position;
* Then press T=5s 🡪 against a box with the back of the hand trying to reach extension position;
* Then release T=5s 🡪 stay relaxed in neutral position.

File recorded are saved as **.csv** and named **“…\_p\*\_mvcflex”** and **“…\_p\*\_mvcext”**

Where **“p\*”** stands for = **participant number**.

## 2nd Trial: Isostatic task

We measured muscular activities in **isostatic positions**:

1. **Neutral** 🡪 **hold for T =10 s**

your harm horizontally and parallel to the ground in a comfortable position without making any effort;

1. **Flexion** 🡪 **hold for T =10 s**

your harm horizontally and push your wrist to flexion position and stay there making a natural pushing effort;

1. **Extension** 🡪 **hold for T =10 s**

your harm horizontally and push your wrist to extension position and stay there making a natural pushing effort;

File recorded are saved as **.csv** and named **“…\_p\*\_neutral”**, **“…\_p\*\_flexion”,** **“…\_p\*\_extension”.**

Where **“p\*”** stands for = **participant number**.

## 3rd Trial: Dynamic task

We measured the muscular activation of the wrist during a **dynamic task**, without holding any weight. The task consist in moving from neutral to flexion and extension in the same trial.

* Start from **Neutral** 🡪 hold for **T = 5 s**;
* Move to **Flexion** 🡪 hold for **T = 5 s**;
* Come back to **Neutral** 🡪 hold for **T = 5 s**;
* Move to **Extension** 🡪 hold for **T = 5 s**;
* Finish to **Neutral** 🡪 hold for **T = 5 s**;

File recorded are saved as .csv and named **“…\_p\*\_dynamic”**. Where “p\*” stands for = participant number.