

Motion Browser: Visualizing and Understanding Complex Upper Limb Movement Under Obstetrical Brachial Plexus Injuries

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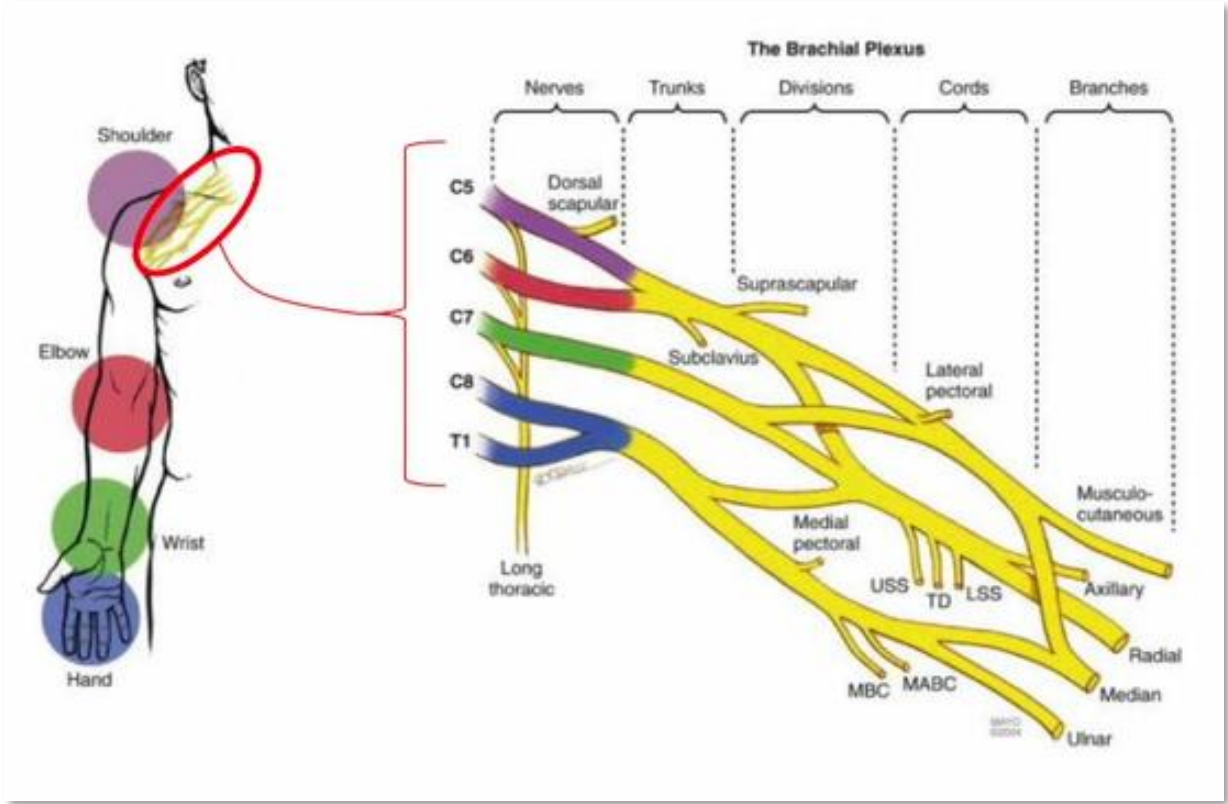
Development of Novel Technology and New Treatments for Muscle Stiffness, Emotional Regulation and its Interaction with Recovery



Viswanath Aluru, University Of Illinois Hospital Health & Science Center

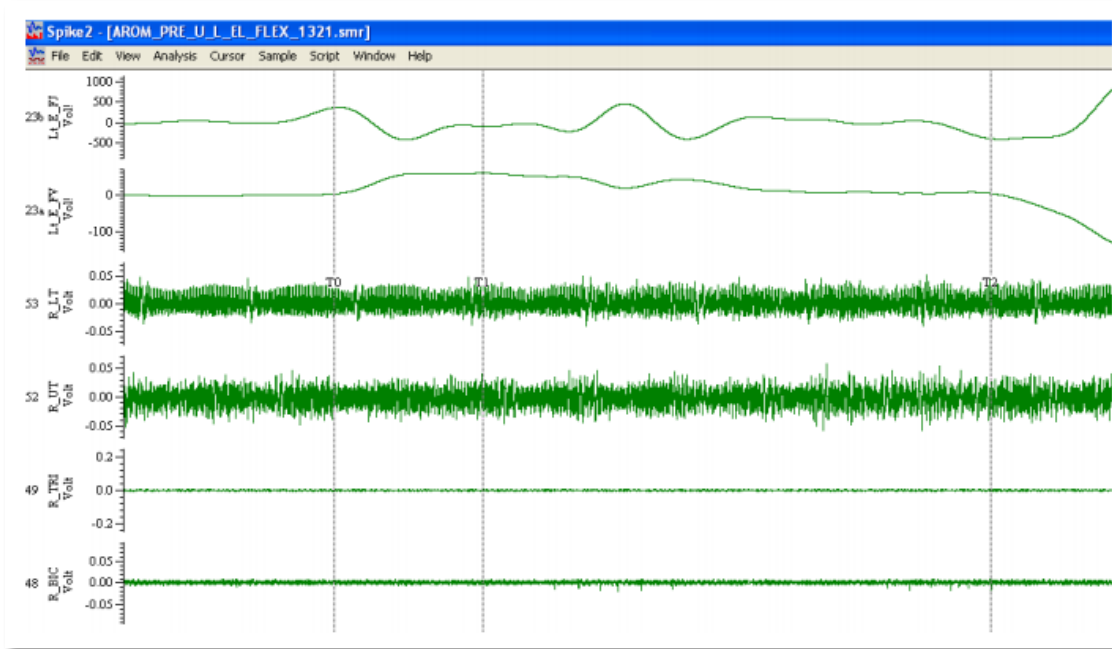
Introduction

Obstetrical Brachial Plexus Injuries

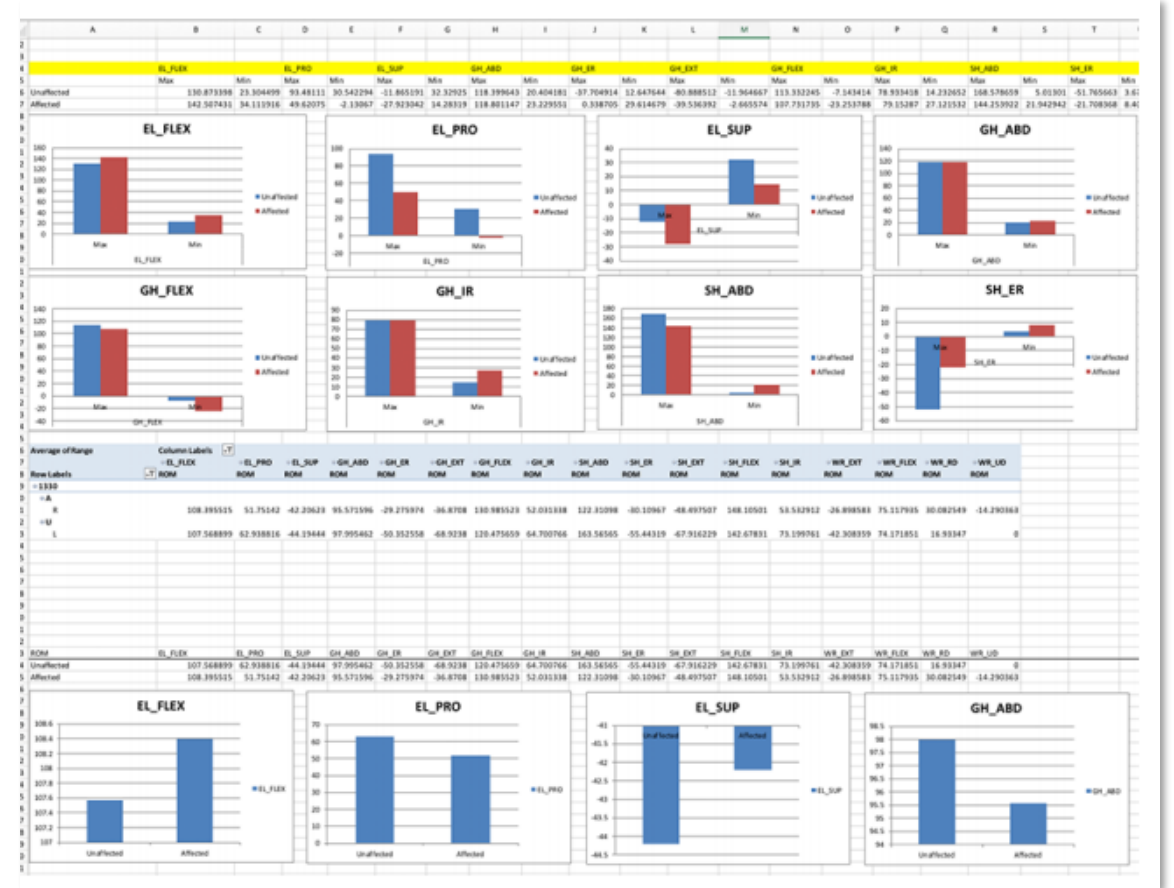


Introduction

Current Tools



(a)

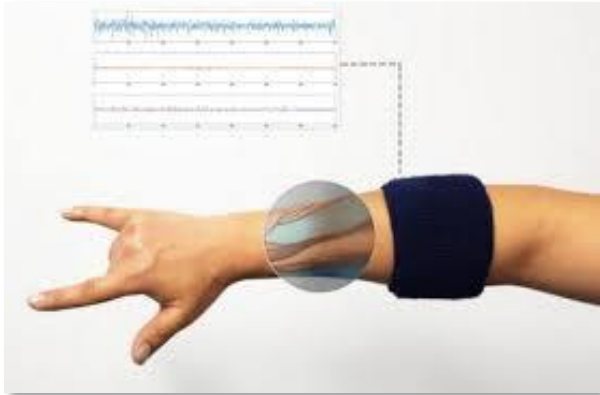


(b)

Introduction

Active Range of Motion Assessment

1 Electromyography(EMG) signals of muscle activations



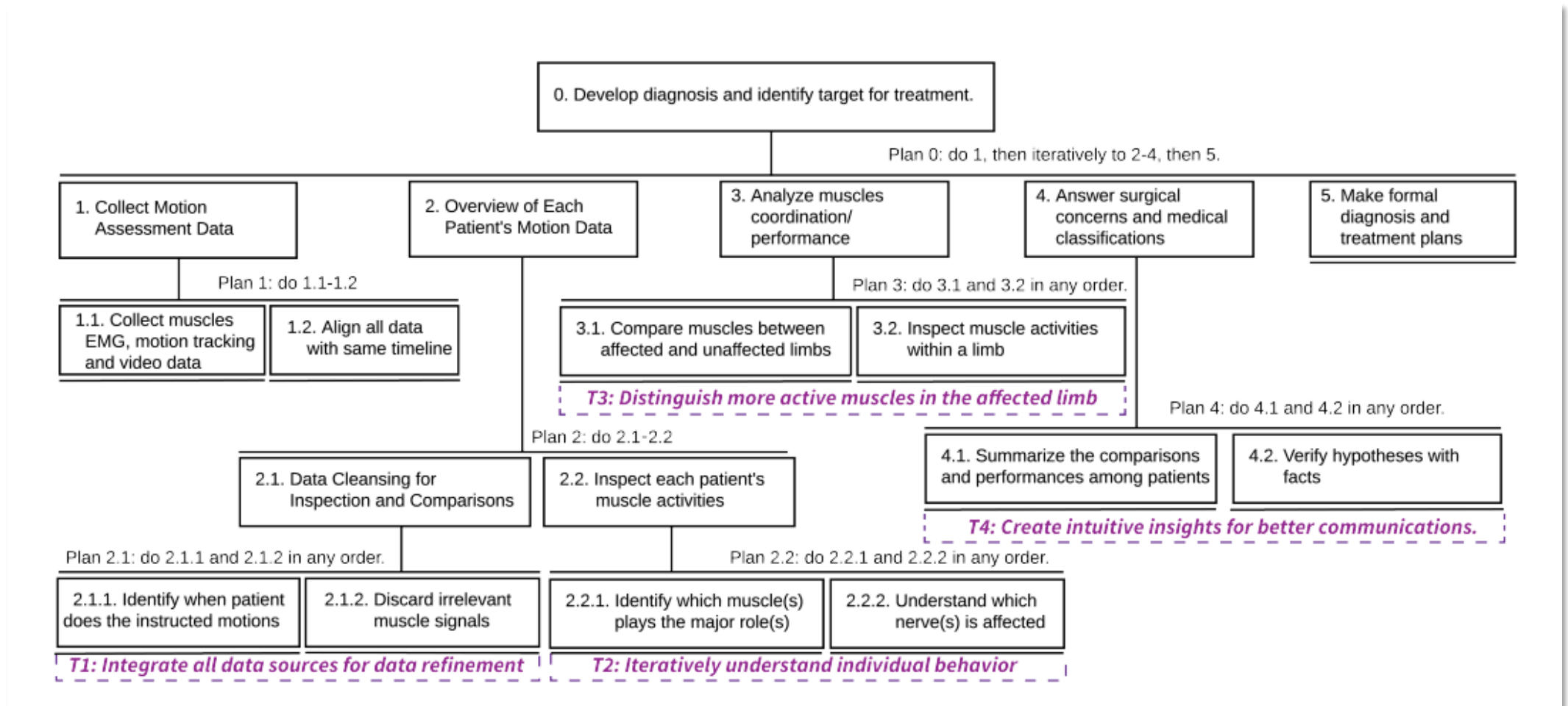
2 Motion sensors recording limb displacement

3 Video recordings



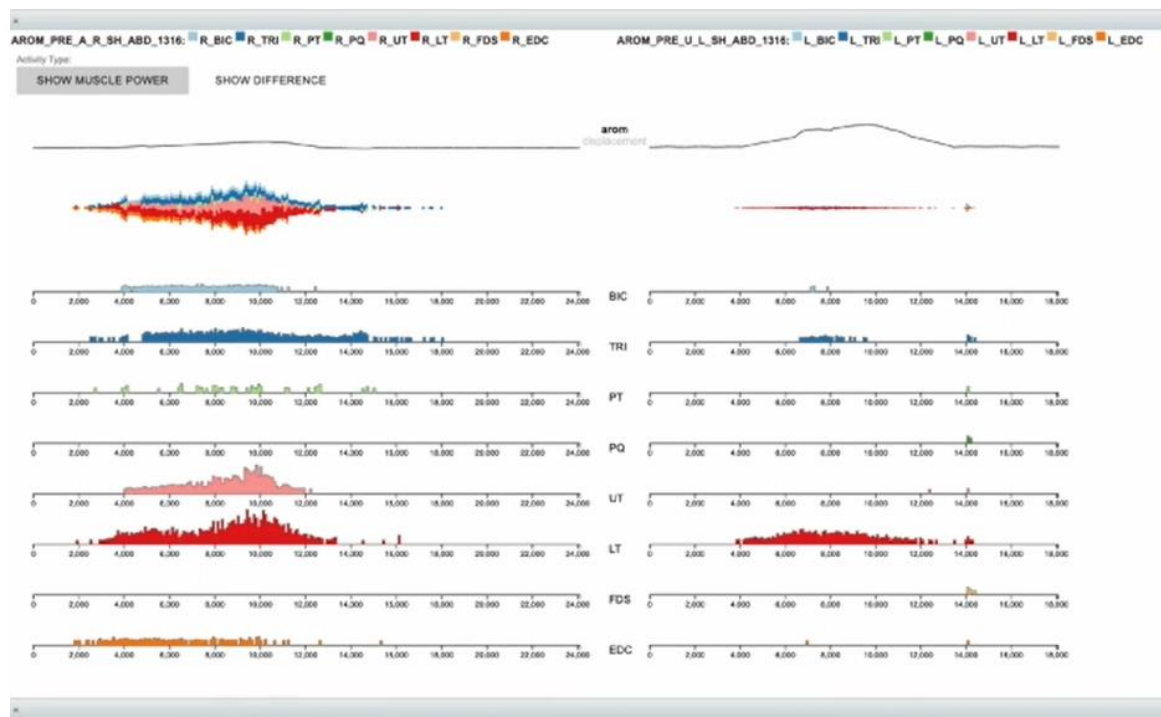
Task and Design

Task Abstraction



Task and Design

Task2: Overview of Each Patient's Motion Data



(a) Patient A



(b) Patient B

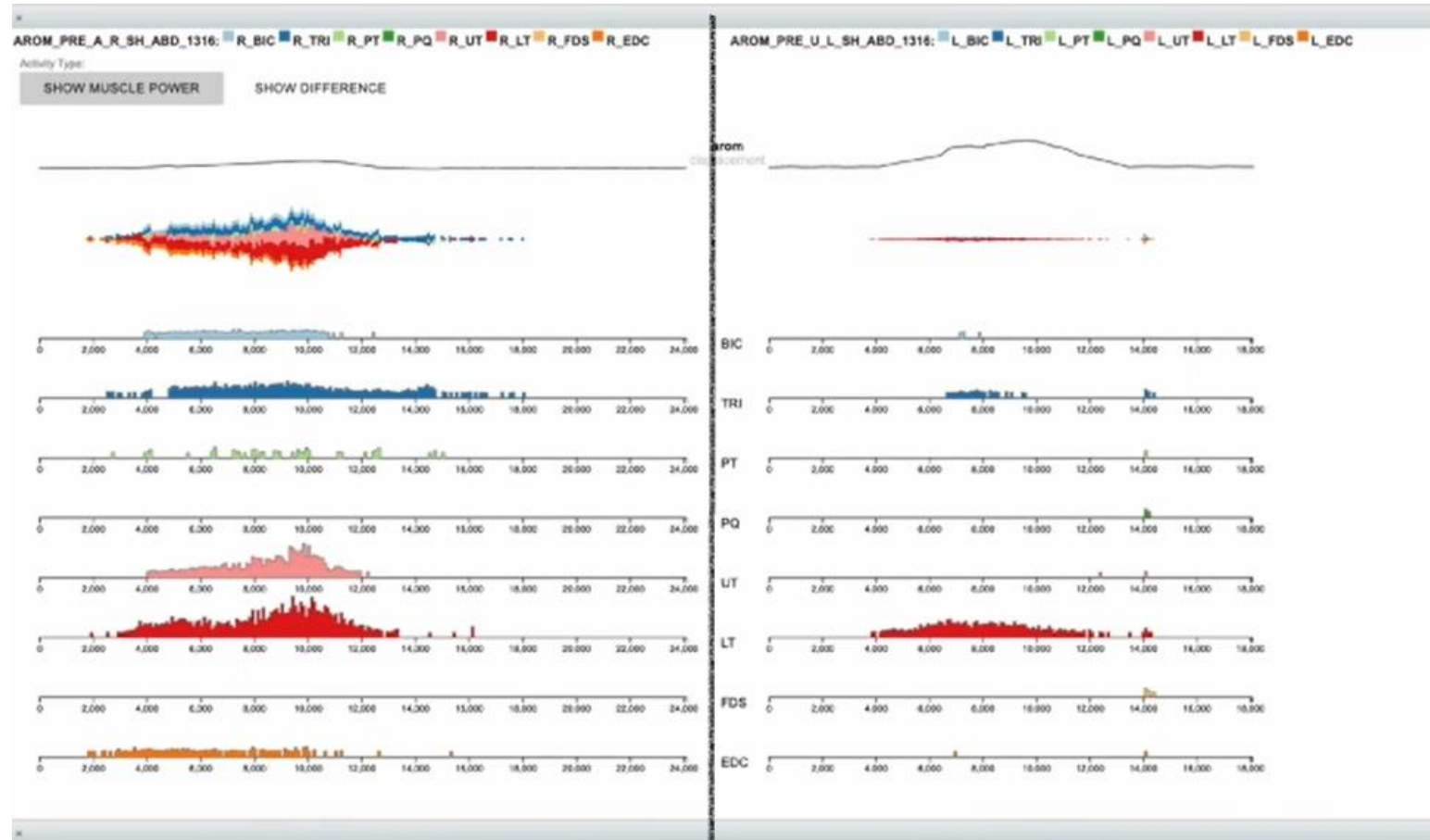


Task and Design

Task3: Analyze muscles coordination

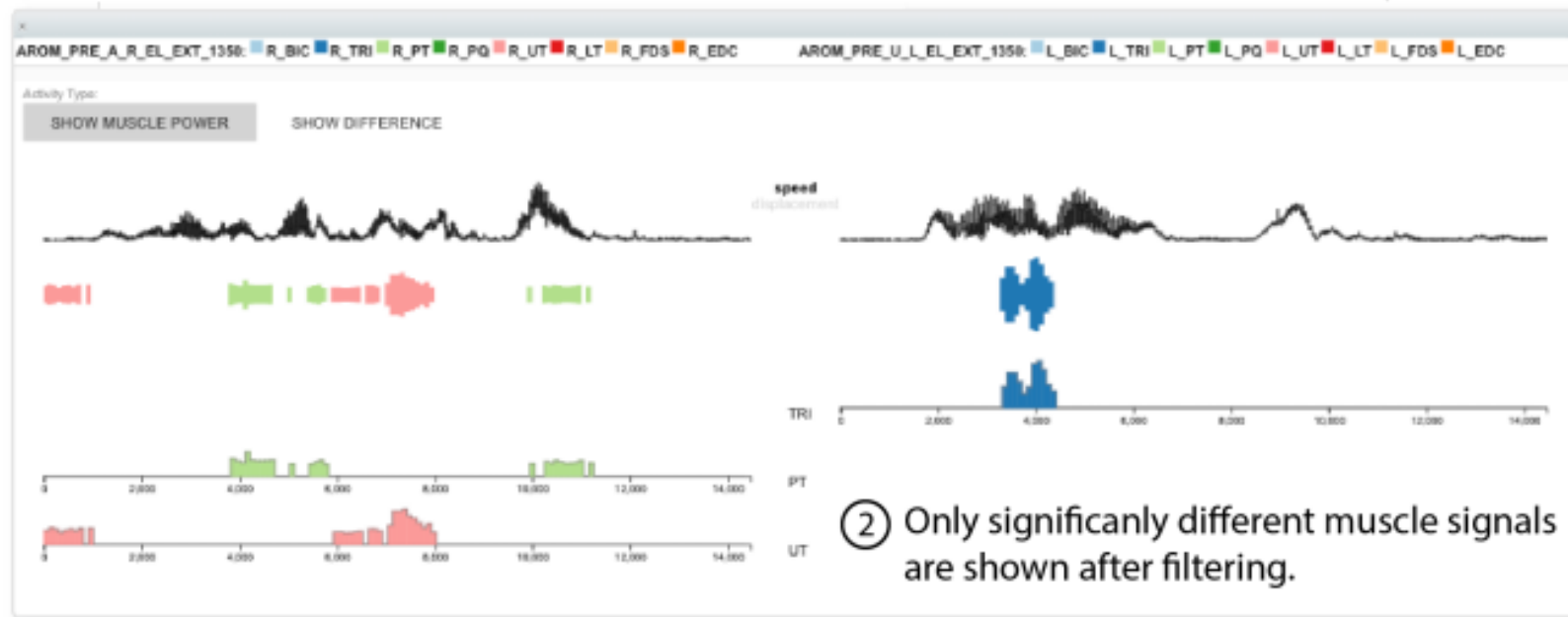
Affected limb

Unaffected limb



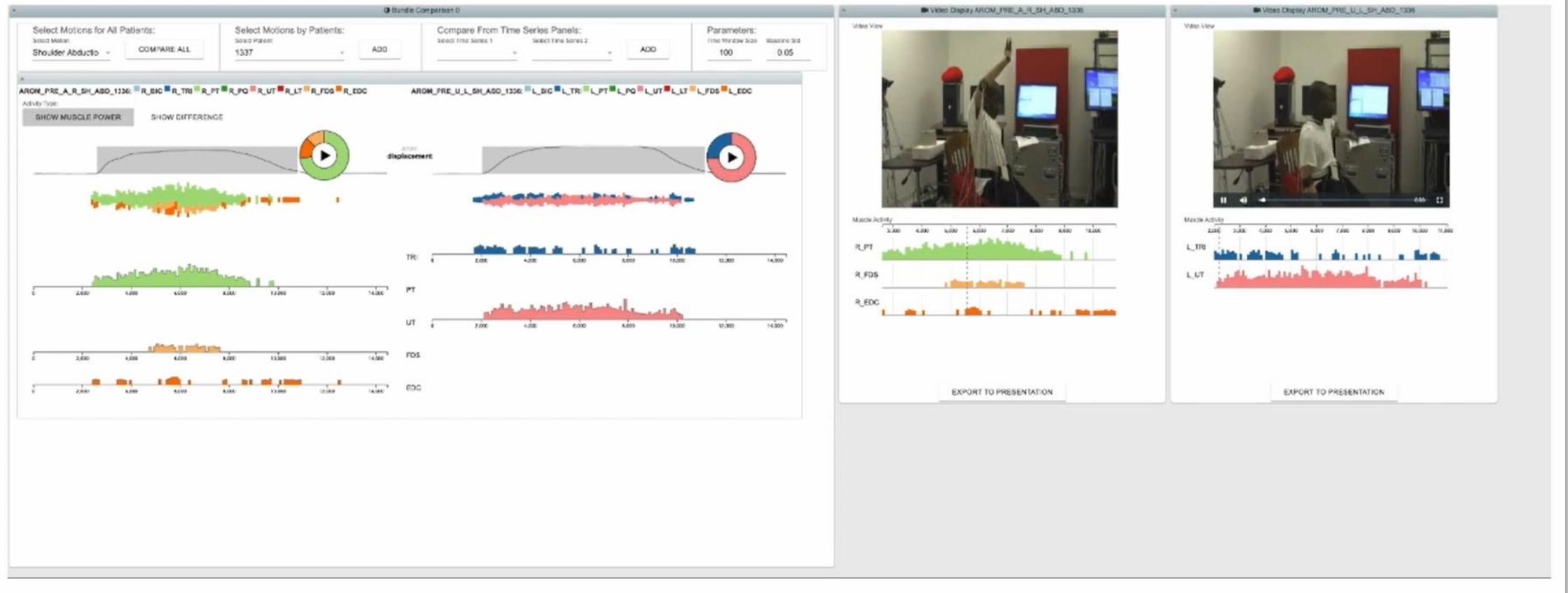
Task and Design

Task3: Analyze muscles coordination



Task and Design

Task4: Verify hypotheses with facts



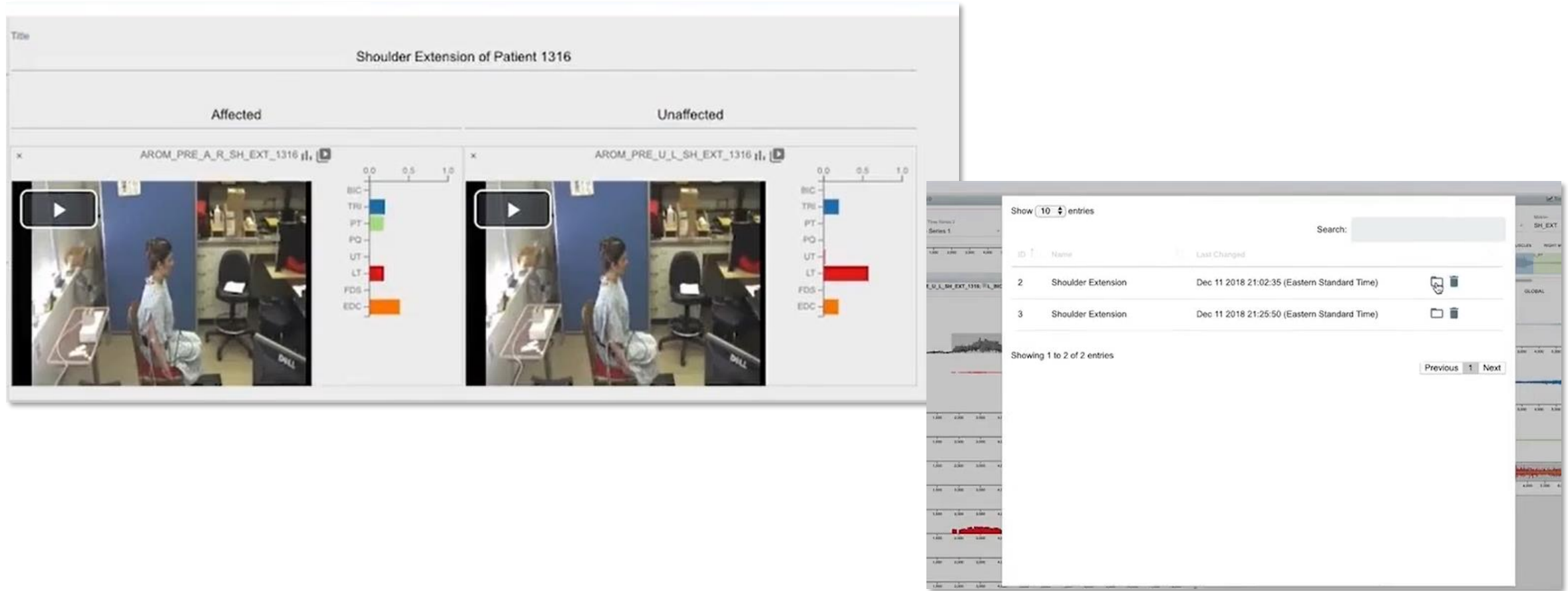
Task and Design

Task5: Summarize the comparisons among patients



Task and Design

Task6: Better Communications



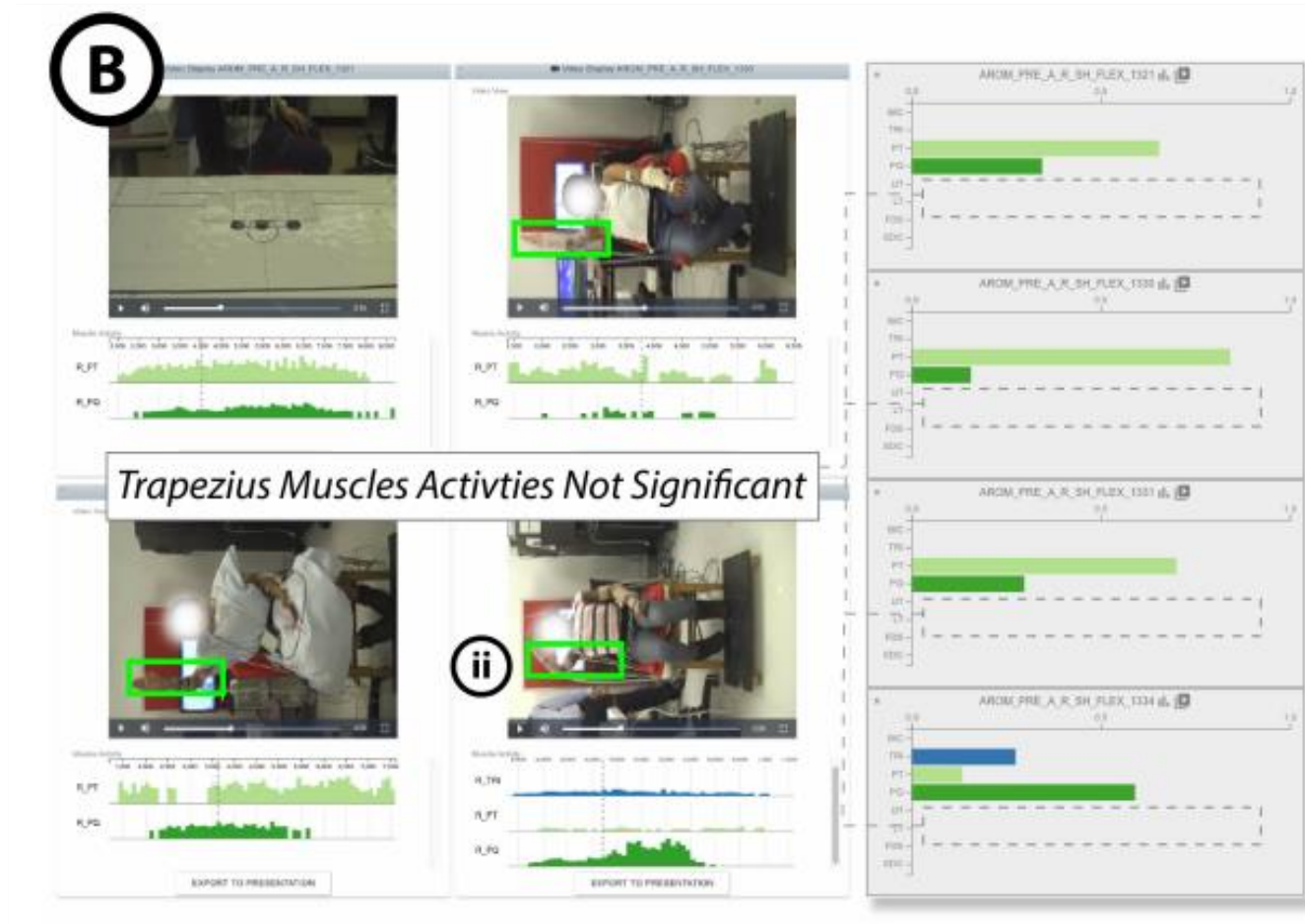
Case Study

Usefulness of Trapezius Muscles (pink and red) on Shoulder Motion



Case Study

Usefulness of Trapezius Muscles on Shoulder Motion



Patients not using trapezius muscles

Case Study

Usefulness of Trapezius Muscles on Shoulder Motion



Patients using trapezius muscles

Pros

1. Shortening physicians' cycles of analyzing each patient.
2. It can be easily adapted for othersimilar problems, such as adult motion analysis or sports injury analysis.

Cons

1. It is unrealistic to attach hundreds of sensors to the patient.
2. Perception of noticeable differences between colored signals will diminish when there are more than 12 lines.

Thanks!