



Elbow Post-Surgery Rehabilitation Device

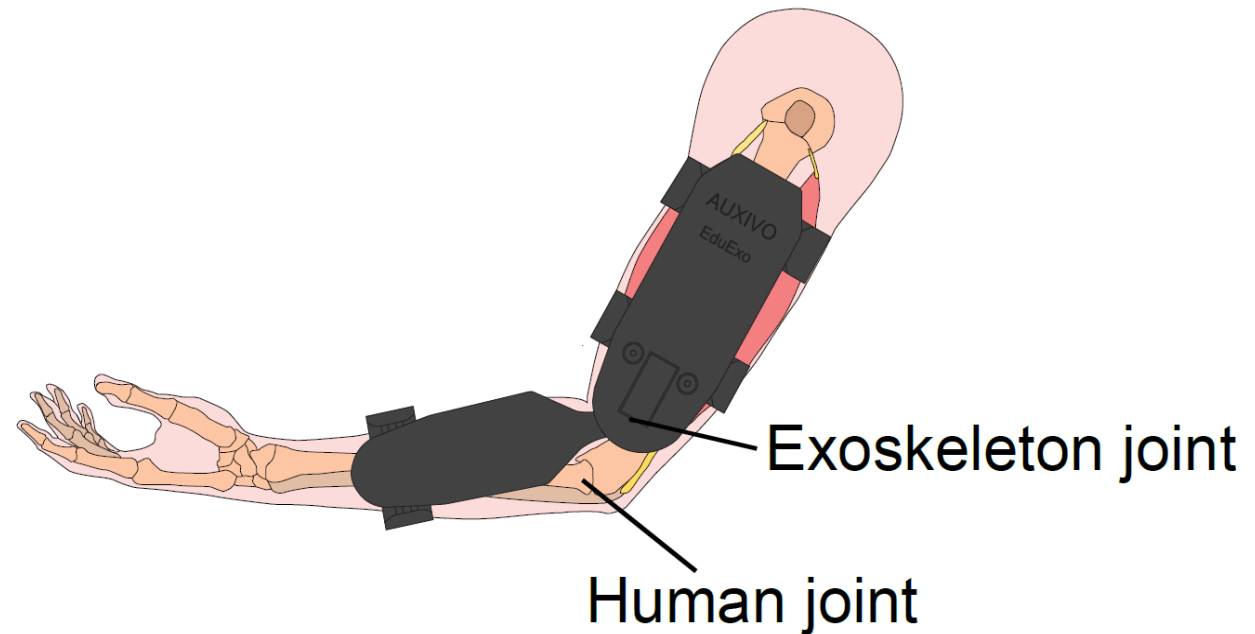
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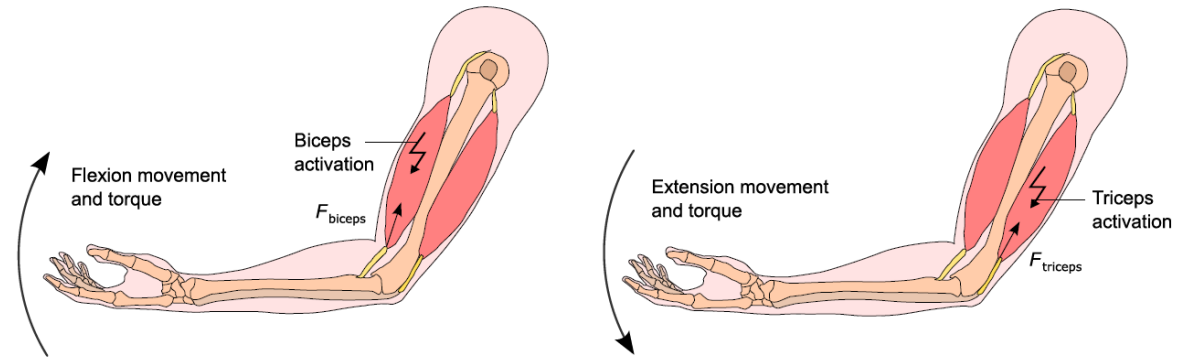
Introduction

Focus on utilising a specialised device for post-surgery rehabilitation of the elbow joint, which aims to facilitate the healing process and minimize re-injury risk.



Initial Patient Situation

- Recent elbow surgery after tennis elbow
- Common post-elbow surgery issue
 - Limited elbow joint mobility, impacting daily tasks like brushing teeth or reaching for objects due to restricted flexion and extension
 - Reduced strength
 - Elbow stiffness & pain



Training objective



- Restoring mobility and strength
- Structured and monitored environment for regaining optimal elbow function
- Empowering patients to gradually and safely restore elbow range of motion, strength, and functionality
- Rehabilitation device addresses temporary elbow disability

<https://media.istockphoto.com/id/1076396050/vector/occupational-therapy-in-rehabilitation-session-for-stroke-patient-therapist-training.jpg?s=612x612&w=0&k=20&c=s94Gza9D6Zo9ZgXp4Dy0QwhktGSxsCnBzMTV1tOPSxo=>

Our Innovative Approach



- Utilize the Edu-Exo for effective monitoring and control the degree of elbow flexion
- Creation of a Unity application for object manipulation between columns
- Virtual interface enables precise regulation of elbow flexion angle
- Facilitates patient learning and maintenance of the appropriate range of motion

Rehabilitation Session Workflow

Put on

- Put on Gear: First, we put the fake arm (prosthesis) and a special sleeve (Edu Exo) on the patient's arm.

Attach

- Attach Sensor: Next, we attach a special sensor (EMG) that checks muscle movement.

Learn

- Learn the Game: The patient learns how the game works. The therapist sets it up to match what the patient needs.

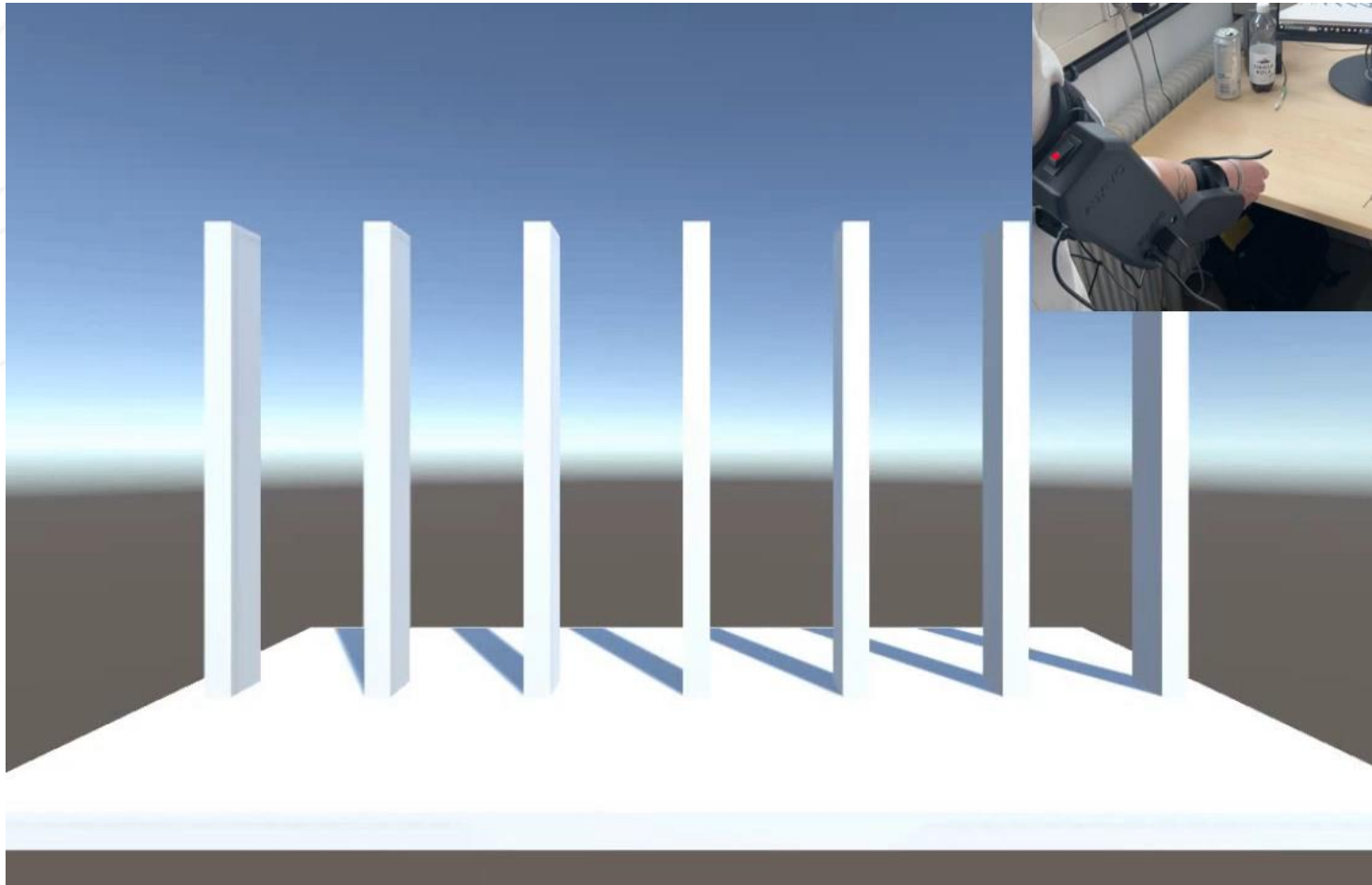
Play

- Play the Game: Play the game threw different motions of you forearm and by pinching

Goal

- Goal of the Game: Stack four same-colored balls over each other to achieve a sparkling shine. When done with every ball the game is done

Demonstration



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Limitations / Improvement



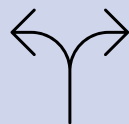
Low-power servomotor



Initial support in arm movement during rehabilitation is possible with motor power



To simulate realistic ball weight, EduExo would need to actively resist arm movement



Enhancing the arm lift difficulty and game can involve assigning different weights to balls

Conclusion

Our approach allows precise control of the elbow's flexion angle within the Unity platform, enabling optimal training and rehabilitation tailored to the patient's needs.

